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ISSN 2057-5955  
is published 48 times a year and copyright

Meko Ltd.  
134 Upper Chobham Road  
Camberley  
Surrey  
GU15 1EJ  
UK

Tel: +44 (0)1252 835385

Follow us : @Display\_Daily

Send any news to:  
news@displaydaily.com

Managing Editor  
Bob Raikes

Business Editor  
Helen Vince

Contributing Editors  
Arthur Berman  
Matthew Brennesholtz  
Vanessa Browning  
Chris Chinnock  
Aldo Cugini  
Norbert Hildebrand

News Editor  
Tom Allen

David Barnes  
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## LCD TV Demand Slows in 2015, After Strong 2014

LCD TV shipments were up more than 7% worldwide last year, says IHS DisplaySearch.

Developed regions exhibited improved demand, although growth slowed in emerging markets. IHS has lowered its forecast for the coming year, to just 4% growth (235 million sets), as demand falls in developed regions.

The strong mature market growth of last year, which was higher than expected, is difficult to maintain, noted IHS's Paul Gagnon. It was mainly driven by a release of pent-up demand and a wave of screen-size upgrades by consumers.

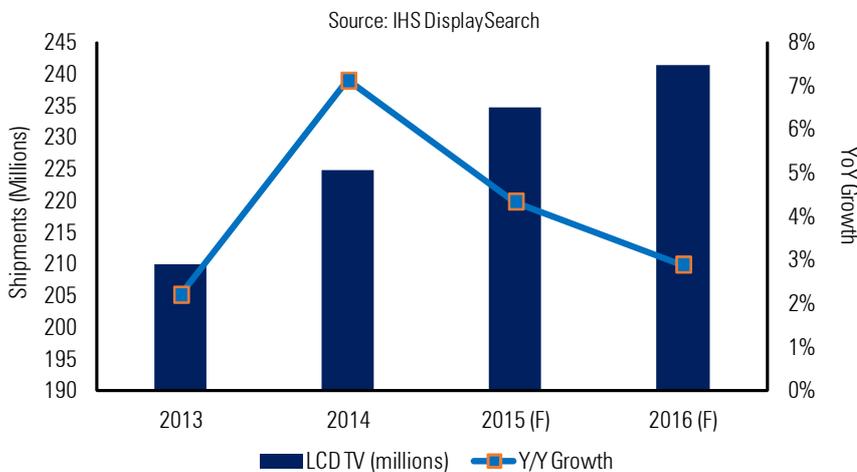
Many countries are facing economic challenges this year, especially currency deflation. TV retail prices are expected to fall more slowly, and may increase if deflation becomes severe. Demand could fall for discretionary spending, especially in Eastern Europe; IHS has lowered its forecast for this region by

18% YoY. Despite this, growth is forecast to remain above 2013 levels.

Continued TV upgrades will also boost UltraHD LCD TV shipments. 11.7 million of these sets were shipped last year - close to the 12.3 million forecast at the start of 2014. With 1920 x 1080 prices falling rapidly, UltraHD is a new premium feature in most regions - helping to soften overall price declines. IHS expects UltraHD LCD and OLED sets to exceed 30 million unit shipments in 2015; more than 60% of these will be 50"+.

Looking at price-per-inch, the average premium for UltraHD models (compared to 1920 x 1080 sets) will fall from, 143% to sub-100% this year. Gagnon commented that IHS expects 1920 x 1080 resolution to start to fade among the largest screen sizes this year.

Worldwide LCD TV Shipments, 2013 - 2016



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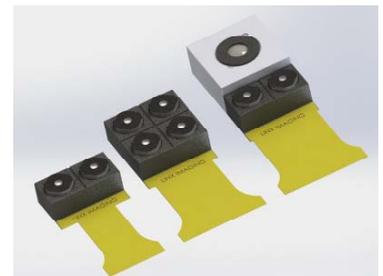
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## Editor's comment



We have a quieter week this week in the mobile area, while the large display side has plenty of news because of the NAB show. I have attended NAB in the past and much of the coverage is similar to IBC. However, the influence of Hollywood and the cinema industry is much stronger at NAB and Chris has a great report from a pre-NAB event run by SMPTE. (The highlights are on the website for MDM subscribers Highlights from the Technology Summit on Cinema).

Last week, I wrote about the desire I had to have a camera that includes depth data after a demonstration of the Intel RealSense technology. I was very smug, therefore, when I read this week that Apple is to buy a company called LinX Computational Imaging of Israel. The firm has some technology that can take images from multiple different cam-



eras (which can be of different types) to get over some of the current limitations of standard smartphone cameras. The use of multiple cameras allows depth maps to be captured.

(Apple, of course, previously bought PrimeSense, which has depth tracking, but this uses a different approach).

The LinX technology also allows some clever things to be done by using multiple cameras - for example by using multiple monochrome cameras rather than using those with Bayer filters you can, at least in theory, capture a lot more of the light for better performance in low light situations. You could also design an array with a combination of colour and monochrome cameras or combining fixed focus and autofocus images.

LinX itself claims to deliver "SLR-type" imagery. We suspect that by this the company means images with shallow depth of field. We would have liked to have got more information, but it looked as though, at the time that I was writing this, the company's website had been under attack. Links that worked when I first saw the story had stopped working, presumably after an overload from those interested in Apple!

The technology reminds me of what I saw at IBC from the Fraunhofer IIS in Erlangen, which is developing multi-camera arrays, although its application was more in the area of professional content creation (there's a video at Fraunhofer Explains its Virtual Camera Technology at IBC 2014). These techniques tend to have very high computational requirements and I would suspect that this would apply to LinX as well. Given that Apple paid only around \$20 million for LinX (according to the WSJ) it may be that this is also a barrier for the engineers in Israel. Certainly, if LinX could do what it claims using today's smartphone processors, I'd have expected Apple to have had to pay more.

Of course, this is a camera technology, not a display, but it seems to me that a big development in image capture with depth would make a big difference to the availability of good 3D content and that has the potential to get the move to 3D displays going again, although there needs to be some time for wounds to heal. One of the big barriers to 3D was that content creators could not use the same workflow for 2D and 3D, whereas for higher resolution, the same cameras and workflows were possible. Adding depth at low cost really helps.

Bob

# Company News

## Panasonic Creates New Unit

The Nikkei reports that Panasonic is to set up a new innovation centre within its AVC Networks company to develop business systems based on "cutting-edge technologies" in the areas of image recognition and voice processing.

Panasonic's first area of interest is reported to be in digital signage that can be used to present product information to consumers as part of a company's omni-channel marketing strategies. The innovation centre aims to generate ¥100 billion (\$829 million) in sales in the year to March 2019, building systems as well as identifying new demand and formulating fresh business models.

The innovation centre is mostly staffed by engineers who will work to develop businesses based on technologies such as payment terminals, advanced traffic systems and Ultra High resolution 8k video systems. Panasonic's main focus is on systems for cars and homes and the company is aiming for group sales of ¥10 trillion (\$83.8 billion) in the year to March 2019. AVC Networks is trying to boost sales in this area by 30% to ¥1 trillion (\$8.4 billion) in the same time frame.

## Rumour: Sharp to Sign Rescue Deal with Banks

Sharp has moved to deny the latest rumour concerning its future, that the loss-making company is about to sign a \$1.7 billion rescue and restructuring plan with its main lenders, Mizuho Bank and Bank of Tokyo-Mitsubishi UFJ.

According to a Nikkei report, the banks will jointly invest the \$1.7 billion in a debt-for-equity swap, while Sharp will agree to cut 5,000 jobs, scale back its North American TV operations and consider spinning off its LCD unit.

The report claimed that while the LCD operations might be spun off to improve transparency and accountability, it would continue to be owned by Sharp for now. Analysts have speculated that a spin off could help pave the way to an eventual deal, such

as a merger with rival Japan Display.

Sharp will release details of its new business plan in May.

## MediaTek Boosted by Demand from China

MediaTek's sales in March more than doubled sequentially to NT\$20.4 billion (\$654.3 million), 3.3% higher than March 2014, thanks to strong demand from its clients in China. Last month's result brought sales for the first quarter to NT\$47.5 billion (\$1.5 billion) which was better than expected, though 14.3% down on Q4. The company's president, Ching-Jiang Hsieh, said in February that Q1 would be MediaTek's weakest period this year as major clients were scaling back smartphone chip orders on inventory correction.

## Sharp TVs to Re-appear in Europe in May

Following the transfer at the end of last year of Sharp's AV business in Europe to United Media Corporation (UMC) in Slovakia (Display Monitor Vol 21 No 42), UMC has now announced that the first new Sharp TVs will be launched in Europe in May 2015.

Sharp's TV manufacturing facility in Poland transferred to UMC at the beginning of 2015, giving the company two Eastern European production facilities and the ability to offer TVs in screen sizes from 22" to 80", produced in a "very well maintained" plant. UMC already operates a manufacturing plant in Bratislava, Slovakia. The company has taken over all of Sharp's sales and marketing activities in Western and Eastern Europe, with the exception of Italy, Russia and Belarus), most recently adding France and Germany.

## MStar to Acquire Alpha Imaging for \$66.5 Million

MStar Semiconductor said it plans to acquire Alpha Imaging Technology for NT\$2.1 billion (\$66.5 million), as part of its strategy to

expand its interests in the Internet of Things and image sensor chip business. Alpha designs chip solutions for TV and web cameras, smartphones and driving recorders.

## Intel, Altera Call Off Takeover Talks

Intel and Altera are reported to have halted discussions on a possible takeover by Intel of the smaller firm because the two parties were unable to agree on price, according to "a person familiar with the matter".

Last month Intel was said to be in the early stage of talks with Altera, which sources claimed would have been one of Intel's biggest ever deals Intel, (Samsung Rumoured to Be on Acquisition Trail).

## Avid to Acquire Orad Hi-Tec Systems for \$60 Million

AV technology company Avid says it has entered into a definitive agreement to acquire Israel's Orad Hi-Tec Systems Ltd. for an estimated \$60 million.

Orad provides 3D real-time graphics, video servers and related asset management solutions. Avid says that the acquisition is consistent with its stated growth strategy and Avid believes it will continue to deliver on the company's future plans for Avid Everywhere, by adding key content creation and media management solutions to the Avid MediaCentral Platform.

Avid said it will fund the purchase price with a \$100 million secured term loan, for which it has already received a financing commitment.

## Acer's Q1 Sales Down 21%

Acer reported sales for March of NT\$24.7 billion (\$793.2 million), representing a 19.8% increase from February but down 19.6% year on year. March's result brought sales in the first quarter to NT\$68.1 billion (\$2.2 billion), down 20.7% sequentially and 11.2% YoY. Acer shipped 4.8 million PC products in the

# Company News, People News

first quarter, declining 22.2% month on month and 7% YoY.

## Corning Claims 100% OLED Brightness Improvement

We hear that Corning is working with OLEDWorks to create OLED lighting panels, using its Willow Glass product. Corning claims that the new OLED panels will be twice as bright as conventional units. The plan is to use Corning light extraction technology to boost output.

## AUO Insists Antitrust Compliance is in Place

AU Optronics (AUO) appeared in a US court this week to deny charges that it had failed to implement an effective compliance programme, after the company was found guilty in 2008 of conspiring to fix LCD panel prices.

According to the arraignment in the US District Court for the Northern District of California, which was initiated by the court's probation officer, AUO has failed to implement a compliance and ethics program designed to prevent a recurrence of the illegal activity. However, AUO refuted the allegation saying that it had taken the required action, including publishing state-of-the-art compliance documents, hiring a former commissioner of the Taiwan Fair Trade Commission as its Chief of Antitrust Compliance, and the repeated training of well over 1,000 employees. In addition, implementation of the compliance programme is overseen by external professional legal counsel which will be further strengthened as necessary.

If this latest court action supports the prosecutor's charge, AUO could face a further fine of \$1 billion and five years probation.

## Hon Hai's March Sales Up 21%

Hon Hai Precision has reported sales in March of NT\$338.3 billion (\$10.8 billion), 20.8% higher than February and 9.9% higher

than March 2014. The company's first quarter sales reached NT\$1 trillion (\$32.1 billion), which was 32.3% down on Q4 but increasing 14.9% from a year earlier.

## Asustek's March Sales Up 21%

Asustek's sales in March improved 21.1% sequentially to NT\$42.1 billion (\$1.3 billion), which was flat year on year. In the first three months of the year, Asustek's sales were just 1.4% higher YoY at NT\$111.9 billion (\$3.6 billion).

## Chip Firms Post Gains in March

Taiwan's two major chip firms reported strong monthly performances in March.

**Taiwan Semiconductor Manufacturing (TSMC)** reported a 15.4% month on month and 44.7% year on year increase in sales in March, reaching NT\$72.3 billion (\$2.3 billion). Sales for the first three months totaled NT\$222 billion (\$7.1 billion), 49.8% higher than the same period of last year.

**United Microelectronics (UMC)** said its revenue in March rose 5.4% sequentially to NT\$12.7 billion (\$407.8 million), taking sales for January to March to NT\$37.6 billion (\$1.2 billion), 18.8% higher than last year and the highest level in the company's history.

## Notebook ODMs Post MoM Increases in Sales

**Quanta Computer** and **Compal** both reported sequential increases in sales last month, with Quanta rising 45.5% to NT\$80 billion (\$2.6 billion) and Compal seeing a 37.3% rise to NT\$74.9 billion (\$2.4 billion).

Quanta's sales in the first three months of the year reached NT\$205.2 billion (\$6.6 billion), which was almost 5% lower than the same period of last year. Compal's cumulative sales to date reached NT\$198.3 billion (\$6.4 billion), up 16.2% year on year.

Compal shipped 3.6 million notebooks in March and 9.3 million units in the first quarter of 2015.

## Taiwan BLU Makers See Sales Rise MoM

Taiwan's two major BLU manufacturers reported sequential increases in sales in March, though for both companies, last month's result was down year on year.

**Radiant Opto-Electronic** achieved a 17.7% month on month increase in sales to NT\$3.1 billion (\$99 million), though this was 15.3% down on March 2014. Sales in the first three months of the year were also lower YoY, down 25.2% to NT\$9.4 billion (\$300 million).

**Coretronic's** March sales climbed 25% from February to NT\$5.6 billion (\$178.9 million), taking sales so far this year to NT\$15.8 billion (\$504.8 million). The company's monthly and year to date revenue, however, was down 12.6% and 17.3% respectively. Coretronic shipped 6.2 million BLUs in March, growing 17% MoM and 18.5 million units in the first three months. In addition, the company shipped 87,000 DLP projectors, an increase of 30% from February and 227,000 units in January to March, slipping 14% YoY.



## Exterion Media Promotes Local Sales Director



Exterion Media has promoted Tony Ramirez to the position of local sales director. In this role, he will be responsible for managing the Exterion Media Local team, which largely

looks after SMEs.

## Finance News



### Intel Result 15/04/2015

Intel Corporation has reported its Q1 results, the first based on the company's new finan-



cial reporting structure which brought its mobile and communications unit together with Intel's PC client business. Turnover was flat year on year at \$12.8 billion, while net



profit rose 3% to \$2 billion from \$1.9 billion a year earlier. Turnover in the newly created Client Computing Group dropped 16% sequentially and 8% YoY to \$7.4 billion.

## Market News

### AMC to Install Dolby Cinema Technology



AT



I'd previously written about Dolby Laboratories' recently introduced Dolby Cinema technology and design (LDM Vol 21 No 48 Dolby to Take on IMAX in Large Format Theaters). This premium cinema system included Dolby Vision with dual laser projectors from Christie, Dolby Atmos sound and

special auditorium design features. The concept was targeted as a direct competitor for IMAX. At the time, the only announced theaters were to be in Europe. The first of these theaters, at the newly constructed JT Cinemas complex in Eindhoven, the Netherlands, opened in December, 2014.

On April 9th, Dolby and AMC Theaters issued a joint press release saying Dolby Cinema will be used in AMC Prime theaters in the US, the chain's premium theaters. These will be the first Dolby Cinema installations in the US. To find out more, I got in touch with Ryan Noonan at AMC Theaters and Joshua Gershman at Dolby Laboratories, media contacts at their respective companies. Gershman passed on some additional infor-

mation provided by Doug Darrow, Senior VP for Cinema at Dolby.

According to Darrow, "The first phase involves converting the current install base of ETX and AMC Prime locations into Dolby Cinema at AMC Prime theatres. The first four screens installed by mid-May will be located in Los Angeles, Kansas City, Houston and Atlanta with another four by mid-June in New York City, along with second location sites in Los Angeles, Kansas City and Houston. AMC intends to expand to 50 operating Dolby Cinemas at AMC Prime by December 2018 in additional cities, including San Francisco, Las Vegas, Philadelphia, Miami, Boston, Denver and Seattle, and up to 100 Dolby Cinemas at AMC Prime by December 2024".

Darrow indicated that all AMC Prime locations are currently co-located with AMC multiplexes and he expects this pattern to continue with future AMC Prime installations. He added that typically the AMC Prime premium over ordinary 2D AMC prices is about \$4 to \$6. The base price and the premium vary by location, of course. Currently, for example, the AMC Prime and IMAX theaters at the AMC Empire 25 on Times Square in New York are showing *Furious 7* at a ticket price of \$20 while the same show in a regular auditorium of the multiplex is available for \$15, a \$5 premium for AMC Prime. Darrow does not expect AMC to increase the premium with the installation of Dolby Cinema.

"Guests should prepare to be blown away when we launch this amazing theatre experience", said Gerry Lopez, CEO and President, AMC. "Moviegoers are already demonstrating they'll drive past other theatres to see a movie in AMC Prime, so combined with

Dolby's pioneering technology, this next-generation Premium Large Format experience will leave them impressed, thrilled and excited by what they see, hear and feel - all from the comfort of their reclining chairs".

When asked if special color grading was needed for movies to be shown on the 6P Dolby Vision laser projectors, Darrow said Dolby Cinema has the capability to playback any type of content. He added, "Films that will be presented in Dolby Vision laser need to have a color grading pass done to the master. Dolby Vision delivers high dynamic range with enhanced color technology that has been praised by filmmakers for its amazing contrast, high brightness and color range that more closely matches what the human eye can see. With Dolby Vision, the blacks are truly black, colors are vibrant and the contrast ratio far exceeds any other laser and xenon-based image technology out in the market today" Exactly which movie will be used on opening night by AMC in May has not been announced yet.

*When the New York City AMC Prime theater comes on-line in June, I hope to be there! (MB)*

## OVAB: Benelux Signage Sentiment Up, But Italy is Volatile



OVAB Europe has conducted more polls of digital signage sentiment around Europe, using its Digital Signage Business Climate Index (DBCI).

Sentiment in the Benelux signage market continued to rise in March/April, according to the DBCI. Since the last poll, in January, the Benelux DBCI rose from 67.39 points to 71.43. The outlook for the next six months is positive, and small-medium businesses are expected to remain important.

71.4% of market participants said that their business is good, while only 4.8% said that it was poor. Going forward, no respondents expected their business to get worse in Q2/Q3 - and 76.2% forecast a rise.

85% of signage projects in Benelux last year were medium-sized installations of up to 50 displays, which is up from 2013's 82%. 10% covered 50 - 99 displays, 4% covered 100 - 500 displays and 1% more than 500 displays. These smaller projects have higher margins and can be tackled by more companies than the larger rollouts.

Vertical markets are important, and retail is the largest vertical in the region - responsible for about 20% of all signage revenues in Benelux. Corporate communications come next, followed by banking (signage in banking is particularly wide-spread in the Netherlands).

Italy's DBCI fell slightly from the January/February survey, down 3.7 points to 19.99. The index developed upwards until last summer, but began to fall from then onwards.

Despite this, the Italian DBCI has remained positive, and is still 3 points higher than March/April 2014. However, the outlook for Q2 and Q3'15 has become much more conservative.

Italy's volatile economic climate has had a slowing effect on the IT market. OVAB believes that signage vendors can still build on 2014's 'robust' earnings to achieve low double-digit growth this year.

More than half of Italian companies report that their current business situation is good, while 25% call it satisfactory; however, 20% regard it as poor. This is an increase from January/February (15.8%) and is one of the most divided market sentiments seen so far in the March/April survey.

Going forward, fewer companies now expect the next six months to improve. From 47.4% in January/February, the number is now down to 35%. Those expecting no change is up from 47.4% to 65%. However, no companies expect the market to get worse (5.8% predicted this in the earlier survey).

Like other European markets, SMBs are important to signage in Italy, generating 90% of revenues. Retail, corporate communications and shopping centre verticals generated 65% of total revenues last year.

90% of all signage projects in 2014 consisted of fewer than 50 displays; 9% were larger than 100 displays.

The DOOH sector is expected to grow over the next 36 months, taking a 10% - 15% OOH market share in 2018. Most growth is expected to come from cross-media campaigns, but new networks are also predicted to generate a respectable amount.

OVAB has also announced that it will begin to cover the Scandinavian region. Scandinavia is the fourth-largest signage market in EMEA, with revenues more than half of that of the DACH region, despite a much smaller population. Signage penetration is relatively high, and the two largest markets - Sweden and Denmark - had double-digit growth of 20% - 25% last year.

**Question:** How do you rate the current business situation for your products & services in the field of Digital Signage?



## Vizio to Bring Dolby Vision to Home Theater



On April 13th, Vizio issued a pair of press releases on its Reference Series LCD displays and its partnership with Dolby. The partnership with Dolby will allow Vizio to incorporate Dolby Vision high dynamic range (HDR) technology into its displays. According to Vizio, these are the first Dolby Vision-enabled televisions. That evening, I attended the Vizio Spring Showcase in New York and had a chance to learn more and see the demonstrations.

In addition to Dolby Vision, the two announced Vizio Reference Series televisions with 65" and 120" diagonals include additional advanced features and are, of course, UHD resolution. Both include full-array local dimming backlights with 384 active LED zones in a 16 high x 24 wide rectangular array. This backlight system enables several things. First, it allows brighter images with a specified 800 nits output, compared to typical LCD TVs with 400 – 600 nits. It also enables the wider color gamut needed for Dolby Vision, although the exact color gamut of the two systems was not specified. In any event, it is larger than the Rec. 709 HD specification but smaller than the Rec. 2020 specification, which essentially requires a laser backlight, not an LED one. While the Rec. 2020 color gamut is the nominal gamut for future UHD transmissions, the Vizio representative said no one was currently mastering content to match the Rec. 2020 primary colors. He did say the LEDs in the backlight use high-performance phosphors but not quantum dots. The LEDs in the backlight generated white light which was then modulated by the RGB sub-pixels on the UHD panel.

*Side-by-side comparison of a Samsung 65" 8550 UHD (left) Vizio 65" UHD Reference Series (center) and a Panasonic Kuro 1080p Plasma display (right). The photo does not do justice to any of the displays.*



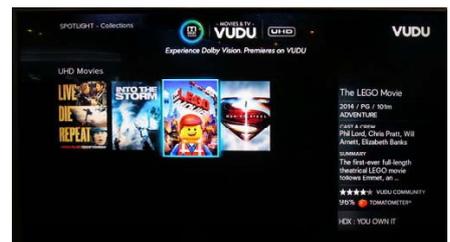
One reason the Reference Series needs higher than normal output is to accommodate the HDR features of Dolby Vision. "High dynamic range" could, in theory, either boost the high light brightness or improve the ability to reproduce multiple shades of grey in the dim regions. But people want bright TVs, so the highlights it is. Dolby Vision demonstrators have had up to 4000 cd/m<sup>2</sup> of high-light brightness, well beyond the 800 cd/m<sup>2</sup> from the Vizio 2015 Reference Series. Maybe next year?

According to Vizio, "The 2015 Reference Series was designed for the cinephile, pushing the boundaries of brightness, color and contrast and featuring an integrated home theater system to perfectly round out the consumer experience". The 65" system was shown in a side-by-side comparison with a Samsung 2014 65" 8550 4k LCD and a Pioneer 60" Kuro 1080P plasma panel that was several years old. The Vizio rep said that this plasma TV had been very well reviewed and was still a favorite with cinephiles. The Samsung and Pioneer sets were showing normal (i.e. Rec. 709 HDTV content, upscaled for the 4k set) while the Reference Series display was showing the same content that had been re-mastered for the wider color gamut and higher dynamic range. The Samsung set had edge lighting and 8 zones: four horizontal bars that were lit separately from the left and right. The plasma set, of course, had no backlight or backlight zones.

I would say the performance improvement of the Vizio set was, at best, only a marginal improvement over the performance of either the Samsung LCD or the Pioneer plasma set. When the representative freeze-framed the image on an explosion, you could see details in the explosion you could not see in the other two sets. At normal speed, however, you didn't really see this detail anyway.

The content Vizio showed as demo content included lots of explosions – the Dolby Vision HDR is intended to show highlights like bright explosions better than conventional technology.

Perhaps the star of the show was the 120" Vizio Reference Series display. It dominated the main room and if you are a cinephile who wants direct view instead of projection for your large screen, this may be your answer.



*Some Dolby Vision/UHD movies available from VUDU, Walmart's video streaming service*

The Vizio Reference Series gives consumers access to Ultra HD streaming content. This will include an initial slate of Warner Bros. 4k Ultra HD Dolby Vision titles that will be available through VUDU, Walmart's over-the-top (OTT) video streaming service. Consumers can find an ongoing list of upcoming Warner Bros. titles in Dolby Vision at <http://www.watchvudu.com/UHD/>. Initial Dolby Vision content will include Into the Storm, The Lego Movie, Man of Steel and Edge of Tomorrow. While these movies were originally produced for normal 4k, they were remastered for the wider dynamic range and expanded color gamut of Dolby Vision. Portions of these movies were used to demonstrate both the 65" and the 120" Reference Series displays.

The Vizio Reference Series TVs have not been launched yet but are expected to be available later this year. - Matthew Brennessoltz

*Matt mentions the 4,000 cd/m<sup>2</sup> that Dolby has shown, but it seems to me that somewhere between 1,000 and 2,000 cd/m<sup>2</sup> may be practical for consumer products. Dolby showed a 2,000 cd/m<sup>2</sup> 32" display exploiting the efficiency of quantum dots off-site during the IFA show. (BR)*

## TV Viewing Falls, Makes Way for Mobiles



Market researcher Accenture has bad news for the TV market. In a new research report titled 'Digital Video and the Connected Consumer', TV was the only product category to experience double-digit usage declines across different media types, worldwide, among viewers of 'nearly all' ages. Consumers are instead turning to PCs and mobiles to consume video content.



Anytime, anywhere video consumption has become mainstream. Long-form video viewing has fallen 13% worldwide over the past year, and by 11% in the USA. Sports viewership on TV screens also fell, by 10% globally and 9% in the USA.

Young people (14-17 years, aka millennials) abandoned the TV at a rate of 33% for films and TV shows and 26% for sport. The decline was less pronounced as viewers grew older: 14% (films/programmes) and 12% (sport) for 18-34-year-olds; 11% and 9% for 35-54-year-olds; and 6% and 1% for those aged 55+.

An improved streaming experience and longer battery lives have prompted the rise of mobile TV viewing, says Accenture's global broadcast industry lead, Gavin Mann. He added, "The second screen viewing experi-

ence is where the content creators, broadcasters and programmers will succeed or fail".

37% of consumers were found to own multiple devices (some combination of smartphones, laptops/desktops and tablets). 61% of consumers planning to buy a TV will buy a smart model and 25% will buy an UltraHD set - up 7% YoY.

The quality of online streaming services is becoming a concern as more and more people use them. Accenture's data shows that 89% of consumers watch long-form content on connected devices - many of whom say that there are issues with the experience. The primary complaint of 51% of these respondents was poor internet service. Other issues were too much advertising placement (42%); buffering (33%); and loss of sound or distortion during play (32%). If paid services included more content variety, less advertising and better quality, respondents said that they would sign up to them.

Accenture's survey showed that traditional TV broadcasters have an advantage over new market entrants. Respondents were much more likely to prefer services from these companies, even against pay-TV or VoD from brands like Apple, Netflix and Google. "New entrants, regardless of their brand, will have to prove their service quality to consumers to capture significant market share", said Mann.

Second-screen use is wide-spread; 87% of consumers said that they use more than one device at once. The smartphone was the most common companion device globally (57%), particularly among millennials (74%). However, a laptop or desktop was more common in North America (59%, versus 42% for smartphones).

## LG VP: LCD Will Dominate to 2018



Speaking at Finetech 2015 in Japan, LG Display VP Sooyoung Yoon has estimated that LCD displays will represent 90% of the display industry's \$180 billion revenue in 2018.

Yoon spoke about the changing display industry, covering the move from black and white to colour and rising sizes. He expects that the industry will soon see displays with

700 ppi hitting the market. Yoon also said that OLED demand will continue to rise, as display applications diversify and flexible, transparent units are required.



## Technicolor Adds HDR Grading, Develops Pay-TV STB



*HDR dramatically increases the detail in an image*

Technicolor is expanding its colour grading service to include high dynamic range (HDR) grading for films, TV shows and advertising. The company is also licensing an Intelligent Tone Management (ITM) plugin, which broadcasters can use to create HDR content in their own facilities.

The HDR grading services expand content's dynamic range to increase video quality. The services will be launched at Technicolor facilities this year, starting in Los Angeles. They will include solutions for both existing libraries and newly-created content from camera-captured RAW footage. Projects will be graded to the HDR specifications set forth by the UHD Alliance.

Broadcasters and content owners will be able to use the ITM plugin to efficiently produce HDR content. It works by analysing content in real time, providing colourists with direct control of luminance in shadows, mid-tones and highlights. It will be licensed across multiple colour grading platforms, including Autodesk's Lustre and Blackmagic's DaVinci Resolve. An OpenFX version will also be available.

Technicolor has also announced that - to ensure that content is delivered to consumers as accurately as possible - it is developing the 'world's first' UltraHD high frame rate and HDR set-top box. The box is designed

for pay-TV operators; it will decode both high- and standard definition range versions of the same content, using Technicolor's HEVC solution for HDR delivery.

In related news, Technicolor recently conducted a successful trial of a live, over-the-air broadcast using HDR and UltraHD, with the Sinclair Broadcast Group. The broadcast was based on the proposed ATSC 3.0 platform.

Sinclair integrated the broadcasts into its experimental OFDM (orthogonal frequency-division multiplexing) transmission system. The signals were transmitted in real-world conditions, not in a laboratory. HDR content at HD and UltraHD resolutions was delivered in a single layer, with backwards-compatible SDR. New and legacy devices (including TVs and mobiles) were all able to receive and display the broadcast signal.

The broadcast was said to meet the most ATSC 3.0 requirements of any previously-demonstrated system. Mobile tests yielded a received signal up to 60 miles away and, separately, the receipt of the mobile broadcast signal at up to 120mph.

## Razer's 'Black Viper' Wants a Bite of the TV Market



An unnamed source at Razer Germany, speaking to German website Ultra-HDTV.net, has revealed plans for a TV produced by the gaming company.

Razer began as an accessory maker, developing mice, keyboards and headsets. It later moved into displays, with tablets and laptops, and now appears to be moving up a size class, with a 55" model code-named the Black Viper.

Ultra-HDTV.net's source says that the Black Viper is an UltraHD model with lights around the edges, which can be dimmed in Gaming Mode. Meanwhile the 'snake's head' is the Razer Columbra; a camera that can pop out of the top of the TV.

Razer is said to be working on a streaming solution that will link the Black Viper with its Edge tablet, enabling game streaming be-

tween the devices. There have also been rumours of an operating system called Poison OS.

The TV will use HDMI ports, capable of transferring UltraHD at 60fps, as well as DisplayPort. It will also have an HEVC decoder.

Ultra-HDTV.net claims that the TV will be presented at Gamescom 2015

*Razer has being a long-time producer of PC products, but in recent years has begun a move into the console space, with gamepads, wireless keyboards/mice and a streaming set-top box (Razer Strikes Nvidia's Shield). Producing a TV would be a huge change of focus for the company, so we have doubts about the veracity of this news - although integrating the streaming technology from the Forge TV STB would make sense.*

*There's also Razer's fondness for naming its various product families after different creatures; snakes are already used for the company's mice. (TA)*

# Market News

## Intel's Wireless Prototype Uses Skylake



Intel has shown a prototype wire-free laptop at its Developer Forum in Shenzhen, China. The company has been promoting the concept since summer last year, and is now readying reference designs for licensing.

The laptop on show used wireless charging and WiDi to transfer content to external displays. Intel SVP Kirk Skaugen referred to the product as "[T]he world's first PC where you'd never need to connect a wire". He said that several companies, including Lenovo, are interested in developing wire-free products.

The notebook was a hybrid model, with a detachable screen. It also uses Intel's upcoming sixth-generation processor plat-

form, code-named Skylake. PCs using Skylake will begin to be shipped in Q2 this year, although completely wire-free devices will take longer to arrive.

Skaugen also hinted that the prototype would support bio-metric authentication, eliminating the need for passwords.



## Flexenable Joins European Graphene Research



FlexEnable, a spin-off from Plastic Logic (Plastic Logic Divides into Two Companies), is now participating in the Graphene Flagship initiative (<http://tinyurl.com/oo5gj7f>). The Graphene Flagship is a research programme

with a €1 billion budget, aiming to take graphene from laboratories into European society within 10 years. It was launched in 2013 and will move into the core project phase next year.

# Back Panel (Continued)

**EarthLCD** of California has developed a 15" and 21.5" open frame "panel PC" based on Baanto's ShadowSense technology. The firm has also developed a "Pi-box", an aluminium enclosure that encloses a Raspberry Pi Model B+ or Pi 2 and can be bolted onto the VESA mounting points on the back of a monitor.

## The Pi-Box



The **Digital Signage Russia** conference - said to be the country's largest signage event - will take place on 29th May in Mos-

cow's Radisson Slavyanskaya Hotel. Organised by Digisky and OVAB Europe, the conference is attended by venue owners and DOOH network operators. Around 300 del-



INTERNATIONAL CONFERENCE

## Digital Signage - no alternative!

egates from 140 companies visited last year's show.

**Eyevis** and **IVC Technologies** are working together to build an automated visualisation wall; they are also working with the R & D headquarters of an unnamed 'major international client'. The system will be built for research and monitoring in the medical, security and military sectors. The prototype uses Eyevis' 58" UltraHD LCD displays.

**And Finally...** Have you ever thought that your connection was just too fast? Do you struggle to find those precious moments to make a cup of coffee or take a toilet break while waiting for cat videos to load on

YouTube? Fear not - Google has you covered. The company has unleashed a dial-up version of Google Fibre, bringing back the relaxing load bar of a connection 10 years out of date - as well as the comforting squeal of a 56k modem.



Sorry, this is another April Fool's joke! Google won the award for quantity this year - it also showed off a playable version of Pacman on Google Maps; self-driving Chromebooks, which endlessly and automatically browse the web; a keyless keyboard from Japan; Chrome Selfie, allowing users to share pictures of themselves reacting to news stories; and a backwards version of the site at [com.google](http://com.google).

## FDA Does Not Adopt Recommendations on Laser Projection



In a setback for the laser projection industry, the FDA has not taken the advice of industry experts and has issued a tentative ruling that many view does not go far enough in removing roadblocks for the smooth roll-out of laser-based projection solutions.

On February 18, 2015 it published new guidance on laser illuminated projectors. It went into effect immediately, but the FDA 60 days comment period is essentially over.

According to Pete Lude, who provided the update at the SMPTE event, the new guidelines:

- Deviate from consensus of international experts
- Do not incorporate the latest science

- Create a MORE restrictive environment, especially for non-cinema applications

The new guidelines classify digital cinema projectors as class 3B or 4 laser products, requiring an approved product variance, specific engineering requirements, annual reporting and physical installation limitations. And, they can only be sold to theater owners. This is out of step with what the EU is doing, which treats the laser source in a way that is similar to having a Xenon source in the projector.

This is unfortunate and not the outcome the Laser Illuminated Projector Association (LIPA) worked so hard to get. LIPA now has to think about what the next steps will be.

## Spectral Edge's HDMI Adapter Compensates for Colour Blindness



*The Eye2TV enhancement has been applied to the right-hand side of the image*

A UK company called Spectral Edge has announced an HDMI adapter for colour blind TV viewers, called the Eye2TV. The device is meant to make it easier to distinguish between red and green, as well as defining on-screen objects more clearly.

A campaign is running on Kickstarter to fund the adapter (<http://tinyurl.com/nt9fpqf>), with the goal of raising £100,000 (\$149,000) by mid-June.

Eye2TV works with any HDMI video source. It is connected between the source and the display and enhances video on a frame-by-frame basis. Spectral Edge's own 'Eyeteq' image enhancement technology is used to do this. Eyeteq is based on research from the University of East Anglia; it uses mathematical perception models to modify image colours. Spectral Edge claims that the adapter modifies images with minimal impact on the picture, as seen by those who do

not have colour blindness. Picture quality can be adjusted to suit the viewer.

If the Kickstarter campaign is successful, the Eye2TV adapter will be developed and shipped worldwide by March 2016. The concept has been proven on an Altera FPGA development platform for the Cyclone IV CE115 FPGA.

## 100% of German IT Companies Expect Revenue Growth



Germany's Central Association of Electrical and Electronic Manufacturers (ZVEI) has predicted a positive year for the German electrical industry.

Speaking at the Hannover Messe this month, ZVEI president Michael Ziesemer said that 59% of companies expect sales growth up to 2% YoY - and the remaining 41% expect even higher growth. ZVEI predicts a 1.5% overall revenue rise, to almost €175 billion.



# Market News

## TV Sales Rise 3% in Europe, but ASPs Fall



Market research by GfK, published by Germany's Association for Consumer and Communication Electronics (GFU), shows that TV set sales in Western Europe rose 3.2% YoY in 2014. Unit sales exceeded 34 million units, while revenues rose 0.2% to €16.3 billion.

As seen from the difference in unit and revenue growth, the average TV sale price fell last year. GfK's data shows a 3% fall, to €477, across Western Europe. In Germany the ASP was down 4.8%, to €556 - but, despite the fall, is still the highest ASP in the region, due to German consumers' fondness for large sizes and added value features.

Smart TV sales were up last year, to more

than 15 million - an 18.5% YoY increase. Smart TV revenues reached €11.2 billion, up 10.2%. These sets had a 44% share of the total TV market across the region, and a 57% share in Germany.



## Event Report - RealD at NAB

### RealD Truelmage Now Available as Cloud Service for High Quality Image Enhancement



In July 2014, I had a chance to visit RealD's Boulder facility and to learn more about its Truelmage processing technology (see RealD's Truelmage Technology is Pretty Amazing). At NAB 2015, RealD announced that Truelmage is now available as an Amazon Cloud-based service through Sundog Media.

The above article provides a lot of detail on what Truelmage can offer, but to summarize, it can:

- Greatly reduce sensor quantization noise in dark scenes (the blue channel can be horrible if you look at it)
- Clean up visual differences between the cameras of a stereo frame
- Add-in film grain
- Improve dynamic range, which also helps improve the encoding process by making it more efficient with smaller file sizes (5-20%)
- Upscale 1080 content to 4K resolution (2D or 3D)
- Truelmage eliminates artifacts commonly associated with digital and film based capture through a proprietary process, resulting in higher quality imagery which is more detailed, lifelike and a more accurate reflection of a content crea-

tor's intent. It does this by calculating more than a million points of data per pixel to correct for artifacts, reconstructing an image with the originally intended aesthetic, without compromise.

Sundog Media is a post production house that has worked on a number of leading Hollywood productions. The Truelmage service is now integrated into their toolkit and part of a drop-down menu item. Single frame, scenes or an entire project can now be run through the Truelmage processor, which sits in the secure Amazon cloud. This is an automated process, but some artistic control can also be implemented.

RealD and Sundog see the technology being useful for current production movies as well as archival library content.

Among those expected to utilize RealD Truelmage on the Sundog Media Toolkit cloud platform will be Academy Award winner Ang Lee. Lee stated, "I have seen the RealD Truelmage footage and am excited about the potential of using it on future projects".

RealD Truelmage is also expected to be integrated into the post production workflow of upcoming National Geographic Studios productions. Mark Katz, President of Distribution, said, "RealD Truelmage addresses many of the big screen challenges Nat Geo's 3D documentary films face including such things as low light levels, grain and stereo coherence. RealD Truelmage adds additional clarity, consistency and detail to the images that may not otherwise be achieved".

This summer, the highly anticipated digital 3D re-release of the feature film, "Hero," starring Jet Li, will utilize RealD Truelmage in Sundog Media Toolkit as part of the post production 2D to 3D conversion process. A worldwide success released in 2D in 2002, "Hero" is being converted to 3D by Asia-based media organization, TWR Entertainment, Inc.

# Event Report - Technology Summit on Cinema

## TECHNOLOGY SUMMIT ON CINEMA

Building the Future of Storytelling | Saturday, April 11 - Sunday, April 12 | #tsc

### The Impact of the Digital Film Transition on the Industry

The SMPTE-organized Technology Summit on Cinema at NAB kicked off with a panel on the lessons learned in the transition from film to digital. Here, panels noted that the idea of moving to digital film delivery really started to be taken seriously back in 1995, so 20 years ago. For the next five years, SVGA resolution class projectors from Texas Instruments, JVC and Sony were shown to the Hollywood community, who saw potential in the technology. In 1999, Star Wars Episode II was shown at four theaters in digital, which accelerated the activity going forward.

Soon, the Digital Cinema Initiative (DCI) was formed to help guide the development of standards for the roll out of digital projection. More projectors with around 1K resolution were built and deployed and by 2005, it was clear that resolution of 2K was the mini-

mum to meet the needs of Hollywood. 2005 also coincided with the first digital 3D screenings. While the ability to show 3D with digital projectors had been discussed, few anticipated that this would soon drive the adoption of digital in theaters as exhibitors were able to deploy a single projector, charge more money for the 3D and actually make a profit. The development of the Virtual Print Fee model also enabled wider deployment to begin in earnest after this.

While the financial crisis that started in late 2008 slowed roll outs, they reached their peak in 2010 with hundreds of projectors being installed in theaters per month on a worldwide basis. Over the last five years, some of the benefits of these digital platforms have begun to be explored as well. This includes the ability to deliver alternative content in time periods when demand for movies is slower, high frame rate, personalized audio and now laser projection, which can allow high brightness 3D presentation.

The panel noted that overall the expense of operating the theater has not changed much during this transition, with staffing lev-

els remaining about the same. But they have been able to deploy this staff in more customer-focused activities. On the other hand, there has been an increase in back-of-house as well as general and administrative costs, mainly attributable to VPN administration.

Exhibitor chain Carmike ignited the boom in 2005 when they purchased 2300 DLP projectors fearing they would not have access if they waited. These projectors are still in use, said the company and they might get 15 years of life from them, not as good as the 30 years film projectors offered.

On the production and distribution side, life is different as well. Digital technology has allowed more features and capabilities in film making, but versioning has grown tremendously. It is not unusual to have 60 English language versions of a major theatrical release and over 200 with different audio tracks. And, last minute changes come later and later in the production cycle, which digital can handle, but film could not.

*Overall, the panel thought they have done a good job in the digital transition, but that it took longer than they thought. Plus, there is much more coming to keep things interesting.*

### Cinematic VR Capture is a New Artform

At TSC, Jaunt VR CTO Arthur van Hoff gave a keynote address and participated in two panel discussions. In his keynote, he started by providing a nice overview of current VR headsets noting that the explosion of smartphones and the technology inside is the reason that VR applications are now poised to take off. AR applications will lag VR he thinks, as these solutions present much more difficult problems to solve in displays,



# Event Report - TSC

tracking accuracy and registration, applications and the user interface.

In VR, one class of headsets, such as Google cardboard and Samsung GearVR, is more mobile and uses smartphones to power them. A second class offers a more powerful solution but requires tethering to a beefy PC. Examples here include the Oculus Rift, Sony Morpheus and Microsoft Hololens. The mobile devices are available today but the higher performance class devices are still in development.

Jaunt, along with several other competitors, makes a 360-degree capture camera. He sees these products in a different category from the rash of consumer-oriented 360-degree or 180-degree capture devices. These consumer devices are small, lightweight and try to cram the cameras close together for low cost. But this close packing also makes it difficult to create good stereo images and their small form factor means they are likely to be used by consumers in very mobile acquisition applications. Such mobility is not a good thing in immersive VR playback as it causes nausea quite quickly. For these reasons, he sees user-generated content not being very compelling as a driving force in the near term.

Professionally generated content seeks to overcome these shortcomings with better rigs, improved stereo pair generation and better stitching algorithms. He calls these 360 cinematic cameras (see photo – the Jaunt device is in the lower left).

Jaunt's capture platform has been used in a number of ways so far ranging from concerts, to red carpet events and including mu-

sic videos, travel promotion, news gathering, education, advertisements, sporting events and more.

Jaunt has learned a lot in developing the techniques for 360 cinematic capture, but there are a number of production challenges. He listed:

- Story telling and ways to focus attention in 360 VR – pointing is one good way as there is no director to give you the viewpoint
- Set construction and lighting – it is now a 360 degree set. Where do you place the cameraman?
- Camera motion – stable and stationary or slow dolly rolls is best
- Sound production – you need 3D immersive sound. They actually try to localize a sound so it is stationary in space even if you turn your head. Jaunt also now has a deal with Dolby to bring Atmos sound to its VR experiences
- Special effects – tools needs to be developed to support 360 degree formats
- Post production – tools need development and standardization of formats is an issues as well. How do you define the frame rate, resolution, field of view, stereo or mono, camera sync, stitching algorithms, 3D sound, etc.? Should all of this be carried as metadata to aid in headset rendering?

Jaunt is now offering VR content as a cloud-based service but it is a fundamentally different experience that will require a lot of experimentation to develop ways to use this new story telling medium. Right now, the company is concentrating on getting content out into the market. There is no real business model to support this other than promotional

support from advertisers or promotion groups. Longer term, van Hoff thinks the company may be able to monetize its efforts by charging to distribute live streams like VR concerts, sporting events and more.

*This is a bold new frontier and it will be exciting to watch it evolve. (CC)*

## Archiving and Light Levels Top IMAX Concern List

A panel discussion at the Technology Summit for Cinema featured IMAX CCO, David Keighley and Jan Yarbrough, Senior Colorist, Motion Picture Imaging at Warner Bros. Both were in agreement that theaters are often too dim and the industry should do a better job of ensuring that theaters offer the prescribed 14 FtL (48nits) of peak brightness. Laser projection promises to do a better job of raising light levels, but don't expect this to be a mainstream solution anytime soon.

IMAX specifies its brightness levels at 22 FtL, Keighley also noted and it now has its first laser IMAX theater at the Chinese Theater in Hollywood.



Keighley was also very concerned about the archiving of movies today. In another presentation, the author explained that as digital processing started to take hold in the 90s, the final movie was always archived as film. That practice has now disappeared and no good substitute has emerged.

Yarbrough and Keighley both agreed that if film is stored in a cool room it can still be in great condition 50 years later. But they both also lamented how they have had trouble getting good scans from film that was poorly stored or from LTO storage where frames "just disappeared".

With the advent of new technologies like HDR and immersive audio in multiple flavors,



# Event Report - TSC

the number of grades that studios must perform is multiplying. And, there is no standard for HDR and some of the other tools in the pipeline. Can we ever get to a single master grade from which all others can be derived? Keighley thinks that will never happen.

## Are More or Smarter Primaries the Solution to Metameric Failure in Laser Projectors?

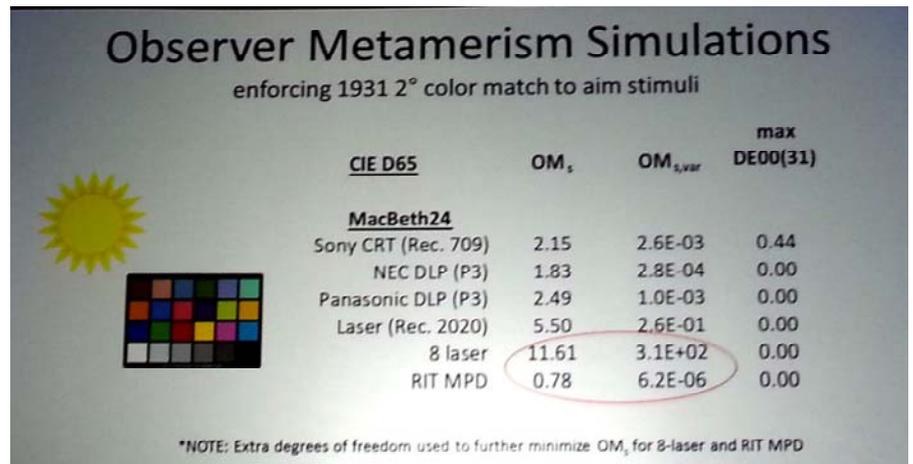
With laser projectors, three very narrow primaries create a very large color gamut that is very close to the 2020 color gamut. But research has shown that with very narrow primaries, people can perceive a certain color differently – something that does not happen with displays that have spectrally broad primaries used in a Xenon lamp projector and many other displays. This is called metameric failure.

In a very informative tutorial on color science, David Long of the Rochester Institute of Technology (RIT) explained some testing they did using the standard Macbeth color chart. They offered a way to measure the degree of failure, finding the 2020 display with laser primaries would indeed be much worse from a metamerism point of view than a CRT display and DLP projectors.

To show metameric failure is real, Long set up an experiment that allowed participants to adjust a laser-based display to try to match a series of gray patches shown on a reference monitor. What he found was a wide variety in the adjusted images.

Long then analyzed a theoretical display with 8 laser primaries thinking that this would improve the metamerism result. To his surprise, it was even worse.

The next step was to propose the RIT Multi-Primary Display that is composed of 7 laser primaries. Analysis of this design showed that it might offer the best metamerism performance – even better than legacy broad spectrum display. The key, Long found, was in the correct choice of the primaries – not just any primaries.



In the question and answer part, Long noted that the current 2020 primaries are not optimized to reduce metamerism, suggesting a slight change would be helpful in reducing metameric failure.

*In addition it occurred to us that existing laser projection displays could be improved for 2D content by using all six primaries in the projector. Normally, these are used for 3D, but if all were used for 2D content each primary would be slightly broadened, which should help with reducing metameric failure. (CC)*

## Barco Describes Continuing Evolution of Escape Theatrical Format

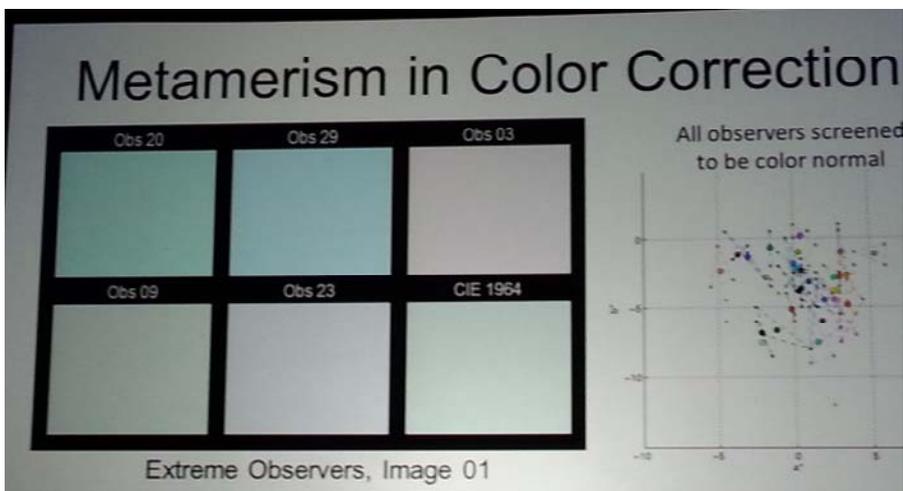
Barco's Escape solution was debuted at last year's CinemaCon. It features a traditional cinema main screen flanked by two side screens angled at about 110 degrees in the current installations. At TSC, attendees heard

more about the development of the platform specifications as well as challenges in content creation.

Dave McKimmie, who was Post Supervisor on the film Maze Runner, started out by describing how they decided to create about 23 seconds of content for the movie in the Escape format as a test. This later turned into about 10 minutes of footage, which was used to officially launch the Escape format in late 2014.

This sequence was first shown in July 2014 with all three screen running 10 bit DPX files from a 7th Sense server in a Rec 709 color space with UHD resolution. The side screens were white 0.7 gain screens illuminated at 10 FtL to reduce contrast-reducing light cross contamination, while the main screen was a 1.2 gain white screen at 14 FtL.

For the 10 minutes of content, the team turned to a different post house that used a game engine to create the side content as the original approach was way too costly to extend to 10 minutes. McKimmie revealed that the 23 seconds of side footage cost the team about \$200K, but the additional con-





tent cost about \$600K, so had a much better cost/second rate.

The theatrical release was in September 2014, but in Feb. 2015, Barco gave a screening at Cinequest. By now, all three screens were running the content as a DCP in a P3 color space with 14 FtL on each screen. The side screens remained 0.7 gain white, while the main screen was a silver screen.

There are currently five Escape screens, but Barco is targeting to have 25 screens ready by September 2015 for the debut of the Maze Runner sequel. Barco plans to incentivize studios to produce more content in the format once more screens are available.

Under consideration is the idea of a continuous screen instead of three discrete screens with a gap between them. The company is also evaluating the best ways to capture content, i.e. three cameras or one camera to spread to the three screens

In a subsequent panel discussion with Jaunt

and Ted Schilowitz and McKimmie, the group was asked if VR could come to theaters? Yes, said Jaunt's Arthur van Hoff, in a couple of ways. There might be a sequence in a movie for example, where viewers are asked to "put on their headsets" and experience a VR segment. There might also be parlors where you go with your friends to simultaneously experience a movie or other event to obtain a shared experience - almost Matrix like.

Schilowitz, who is Barco's cinemavangelist and 20th Century Fox's futurist, agreed saying he knows people who are already working on this in the lab. But not everyone has a VR headset today, so Barco Escape fills a different need for an immersive experience



## Immersive Sound Options Grow with DTS Entry – Standards Remain an Issue

At NAB 2015, DTS announced a new immersive sound solution aimed at theaters as well as consumer use called DTS:X. This appears to be a re-branding of the company's previously developed Multi-Dimensional Audio (MDA) platform. In theaters, it will now compete directly with Barco's Auro3D and Dolby Atmos, and indirectly with IMAX and its current 6-channel and soon to be released 12-channel immersive sound solution. DTS also says the technology will be used in home AVR platforms as well (for more details see "DTS:X Brings Object-based Audio For Cinema & Home"). But within hours, we learned that Dolby revealed to the SMPTE committee on immersive sound that it was opening it up to proprietary bitstream for adoption as a standard, a move aimed at making its approach the de facto standard.

The DTS:X solution is a bit different from the Auro3D and Atmos solutions in its ability to use any speaker configuration, not the preset configurations of the Auro3D and Atmos. That could offer it a big leg-up as many exhibitors are now having to either commit to Barco, Dolby or stay on the fence until some standardization comes along.

The whole idea of immersive sound is to move beyond the traditional single-level 5.1 or 7.1 surround sound solutions to add both a height component to the sound and the ability to make sounds appear to come nearly any point in the domed space above the audience.

Barco does this with an 11.1 solution that is basically a double-stacked 5.1 solution with an overhead channel. Dolby does it with an array of speakers all around the theater. IMAX is now increasing its channels from 6 to 12 to deliver a more precise immersive sound solution.

MDA is DTS's license fee-free contribution to the professional audio community for mixing and storage of immersive audio content. The DTS:X licensing program is for cinema operators to allow them the opportunity to provide their audience with an immersive

# Event Report - TSC

sound experience. To ensure quality and provide flexibility within the DTS:X program, DTS has partnered with server, sound rendering and processing companies. GDC Technology, QSC and USL, have developed and made available DTS:X-ready components that process and render MDA files.

For home theater AVRs, DTS announced that manufacturers representing nearly 90% of the home AVR and surround processor market will launch DTS:X-enabled products beginning in early summer 2015, with additional manufacturer and model announcements to follow in the coming months. Confirmed AVR partners include: Denon, Integra, Marantz, Onkyo, Pioneer, Steinway Lyngdorf, Theta Digital, Trinnov Audio and Yamaha.

DTS:X solutions are also available for 2015 AV receiver silicon platforms representing the majority of the DSP platform market share, including Cirrus Logic, Analog Devices and Texas Instruments.

At the Technology Summit on Cinema, there was a panel session that discussed immersive sound from a sound mixers' perspective, studio perspective and standardization perspective. Brian Vessa represented Sony Pictures and he is also chair of the SMPTE committee looking at standardizing immersive audio. Will Files is a sound mixer at Skywalker Sound.

Clearly, one of the biggest concerns of the studios, sound mixers and exhibitors is the number of competing solutions in the market today. Each solution from IMAX, Dolby, Barco and DTS is incompatible with the others. That means movies have to be mixed

separately for IMAX (6 and 12-channel), Auro3D, Atmos, DTS:X and 5.1 and 7.1. That's a lot of extra work that the studios don't want to pay for. In addition, there is no standard for archiving of immersive audio, so studios must archive all versions, which is not efficient.

From the exhibitor perspective, they have to commit to one of these solutions, which does not afford them much flexibility. Rendering solutions are unique as are the speaker configurations and calibration procedures.

In his presentation, Vessa laid out what the SMPTE committee is trying to do to develop a standard that can allow some interoperability between these competing solutions. Started in October 2012 and called TC-25CSS, Vessa's committee has issued a report and continues to meet on a regular basis to develop the proposed standard. He is optimistic that it will be available by the end of 2015.

Vessa says that the team is focused on developing a standard for a bitstream that would contain the sounds as well as the instruction the sound mixer used with faders and joysticks to create the desired immersive effects. This is called the SMPTE Standard Mix File in the workflow diagram below. That means one immersive compatible mix that can be used to derive company specific implementation at the theater, plus other derivatives like the Blu-ray master or streaming files.

Vessa says this approach maintains the industry's ability to innovate and offer alternative solutions. To translate the standard mix file at the theater into a Dolby, Barco or DTS

mix would be an automated process that could be done in the Integrated Media Block (IMB).

But mix engineer Will Files is not so sure this is feasible. He noted that when he does a mix with Dolby Atmos, he uses the location of the speakers, their sound pressure levels and more to create a mix that is adapted to the characteristics of the speakers. Different speakers have different responses and pressure levels, which he is not sure can be automatically transformed by an algorithm.

Vessa says this concern is being echoed in the committee meetings and one of the things they are working on is a reference rendering solution for the theaters to show how this will work. He hopes this can be demonstrated by the end of the year.

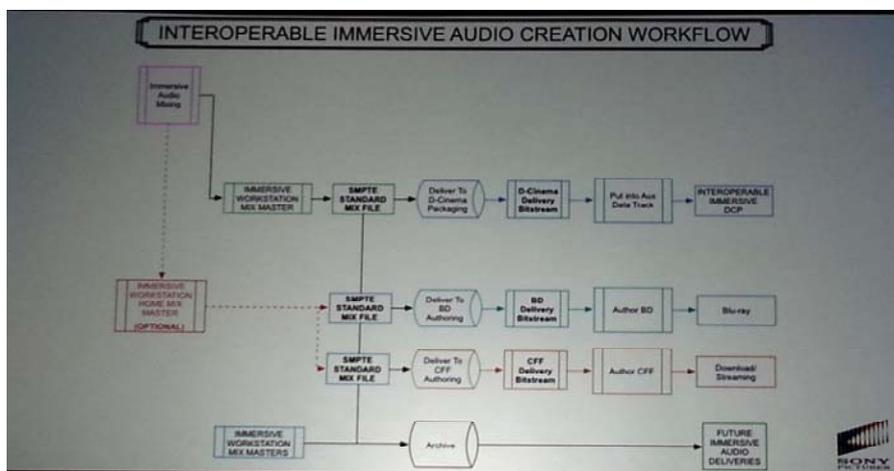
*Clearly, there is much more work to be done to develop this standard, but with economics driving the need, it will find support among many key players. However, with Dolby now offering its bitstream format as a standard, studios and exhibitors may rally behind it. This will open up more companies to make in-theater processors that support the Dolby bitstream, expanding competition, something exhibitors will like.*  
(CC)

## Disney Research Adds Attributes to Each Pixel

Disney Research used TSC to describe the filming and processing techniques developed in the making of a short film called "The Dream of Gabriel". The organization is working on a number of advanced film-making technologies and wanted to try them out on a real production. The results were impressive.

The film was produced on a small budget with a few actors on location in Switzerland using an Arri camera that captured RAW data at 120 fps. The post production process took 250 days as many new technologies were developed and refined in this period.

As part of the storyboarding process, Disney decided to try different frame rates for different aspects of the film. For example, normal reality would be captured and played back at 24 fps but elements that happen in the supernatural world or in lucid dream sequences would play back at 48 fps. Different



# Event Report - TSC

shutter angles were used within these sequences as well.

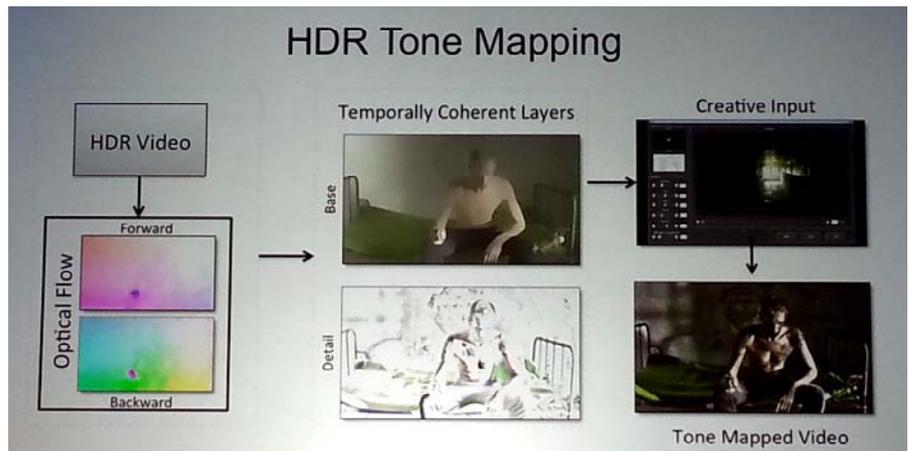
The team has been working on a very innovative suite of technologies called “per pixel flow-of-time”. This allows for global and local (within the frame) frame rate variations; slow motion and retiming, artistic shutters (effects) such as a rainbow, motion strobe and motion/smoke effects, and compositing/temporal alignment. In addition, they were also able to demonstrate the use of high dynamic range tone mapping.

Global frame rates were implemented at 24 and 48 fps for use as a story telling tool. The local varying frame rate tool was amazing. This allowed, for example, the boy to swing at 24 fps while the mother, who is a ghost at this point in the story, swings at only 6 fps, creating a visually and emotionally compelling sequence (see photo, below).

Another interesting technique was called computational super slow motion. For this, Disney took frames captured at 120 fps and computed interframes to achieve an effective 1200 fps rate, but played back at 60 fps. This emulated the ability to capture at 1200 fps using a real 120 fps capture rate.

The special shutters or effects the team developed were particularly cool. These tools analyzed motion in frames and was able to add effects around the parts of the image that were in motion. Effects include a rainbow, smoke and motion strobing – all for artistic effect.

The HDR tone mapping workflow is shown in the graphic at the top of this page.



Two versions of the film were produced at about 10 minutes each, but they were not shown at TSC, although they are posted on YouTube (look for Lucid Dreams of Gabriel). (<https://www.youtube.com/watch?v=3zfV0Y7rwoQ>)

## Screen Technology Gets More Attention

RealD used the Technology Summit on Cinema to provide an update on development of its Ultrascreen technology, which also included the first public demo of its new screen technology showing 4k content from an RGB laser projector. The company was careful to note that this is still an “alpha” product, which means manufacturing methods must still be validated. But it was still good

enough to produce great images and help RealD garner some feedback on the technology.

The basis of the Ultimate screen is “engineered structures”. RealD, along with licensee Harkness and MDI, has already produced a kind of hybrid screen using these engineered particles mixed in paint that can be sprayed on a vinyl surface. This is called the Premium White Screen.

The Ultimate Screen represents a departure from conventional screen manufacture. For very large cinema screens for example, the vinyl screen is often spray coated in the theater. This material and process also limits the size of the perforations in the screen, which are needed to allow sound through the screen. Ideally, smaller holes are better to minimize light loss.

The Ultimate screen technology is manufactured on a polymer substrate in roll-to-roll process. A proprietary diffusion pattern is embossed onto the plastic substrate, which is then metallized to produce the reflective surface. Panels of this screen material are then joined together to create the final Ultimate Screen. The Ultimate screen has an 85% improvement in light reflecting efficiency compared to a conventional silver screen, says RealD. It also allows the use of laser drilled perforations that are very small.

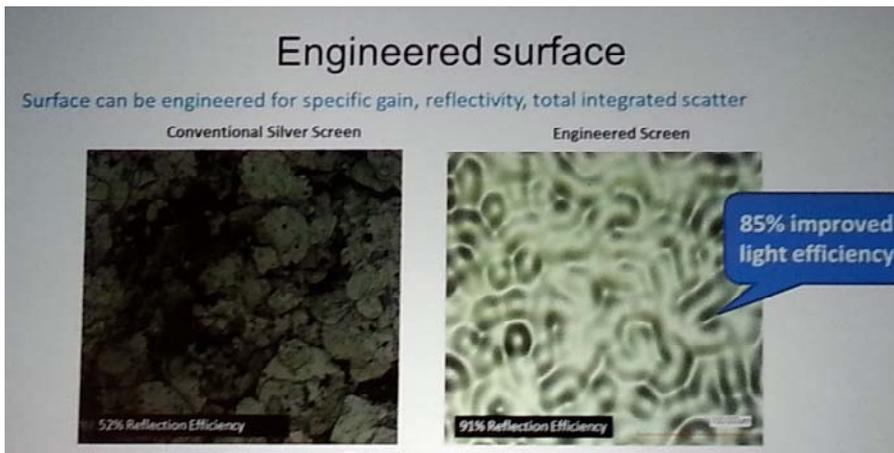
The Ultimate screen is not quite ready for production, but will be offered in two screen gains (2.2 and 3.0) that offer half gain angles of 36 and 28 degrees and a stereo contrast ratio of >300: and >400:1. That compares very favorably to standard silver screens that offer 2.4 and 2.9 gain with 24 and 20 degree half gain angles and stereo contrast levels of <100:1.

## II. Locally Varying Frame Rate



Dual frame rates in one shot - 24 fps (boy) and 6 fps (mother)

# Event Report - TSC



RealD says that speckle reduction can be easily accomplished using small vibrators on the screen, although some laser projectors may not need this. This could be a very important new product for RealD and the industry.

In a talk, former Harkness Screen employee, Keith Watanabe said that there's a bit of a disconnect in the type of screens that exhibitors are buying and what makes money. After doing some research, he said that the top 50 films represent 70% of industry revenue and of these films, 82% of the revenue came from films that were released in the wide aspect (2.35:1) Scope format while only 18% of the revenue came from films released in the Flat (1.85:1) format.

However, in looking at what two major exhibitor chains have purchased in the last 5 years, he found that the average screen aspect ratio was around 1.92:1, or heavily skewed toward the Flat format. He suggested that part of this may be explained in the Premium Large Format space as exhibitors wanting to have an "IMAX effect" of a large, very tall screen.

He suggested that maybe exhibitors should "follow the money" and install more Scope screens.

## Fraunhofer IIS Does Lightfield Movie Production Test

At the Technology Summit for Cinema, Frederik Zilly of Fraunhofer IIS told a very in-

teresting story about the making of their first movie using light field production techniques. Over the last couple of years, his team has developed the technology for light field capture and processing using a 4x4 array of cameras creating short stop motion films. In the latest project, they developed script and shot a few minutes on a real set with actors to try to emulate a more realistic movie production process. (We interviewed Zilly at IBC Fraunhofer Explains its Virtual Camera Technology at IBC 2014).

Now, there are a number of lightfield visual effects that can be deployed. This includes the ability to change the depth of focus, the focus point, the point of view and more. The goal was to try to use a normal post production process using certain filters to achieve the desired effects.

The short was called "Coming Home" and is the story of a man returning home from work and enjoying a nice pot of tea. But the team was careful to create sequences in the short film that showcased all the capabilities enabled by the light field capture and processing solution.



Zilly started by explaining that there are trade-offs in choosing how many cameras to use in the array and how densely to pack them. Large arrays offer viewpoint flexibility and image quality, but this impacts storage and other resources, which can be reduced with fewer cameras. One can also spread the cameras out, but you will lose some image quality. Ultimately, they chose a 3x3 camera array with each camera capturing at 1920 x 1080. The array was mounted in a camera rig with a beamsplitter with a Sony F3 camera acting as a hero camera (emulating the typical production acquisition).

There are several steps in the capture process. The first is multi-camera rectification which aligns all of the images to a common reference frame. This includes geometric corrections as well. The second is the generation of disparity and depth maps from these overlapping images. The parameters for the disparity can be adjusted using a simple GUI interface.

Next came color grading which required matching the color temperatures and luminance of the nine cameras. Finally, a render of the virtual cameras was done to produce stereo pairs for display.

One of the visual effects they wanted to demonstrate was interactive relighting which would allow the positioning of virtual lighting sources in the movie. This can only be done once a full 3D model with textured video elements is available. This was successfully done in a couple of sequences.

Zilly then showed the movie and then ran it a second time showing where in each part of the film they applied the various techniques.

- Chris Chinnock



# Nvidia Shield STB Coming In May

Nvidia announced the Shield STB at the recent Gamers Development Conference (GDC, as discussed by Jon Peddie in his Display Daily from March 9th, 2015. On April 9th, I had a chance to see the unit at Pepcom's Digital Experience in New York and talk to Jordan Dodge, Nvidia's PR Manager for the product.

While Peddie focused on the Shield as a gaming device, understandably since it was introduced at a gaming conference, Nvidia describes it as a 'Living-Room Entertainment Device'.

In addition to gaming, the Shield is designed for streaming content. It has AVC (H.264) and HEVC (H.265) capability along with other video codecs. At Pepcom, it was connected via HDMI to a 50" Vizio 4k set (Model P502ui-B1), which Dodge said it had

just bought at Best Buy for \$699. The company was running 4k 60P content from the Shield to the TV over a single HDMI cable. As you can imagine, the content was gorgeous. In particular, there were no motion artifacts visible, thanks to the 60P content. I went to a movie just last week shown in 24P on a 4k Sony digital cinema projector and the motion artifacts were positively painful and significantly distracted from the story. I wonder when Hollywood is going to catch up with the reality that 4k does you no good at a low frame rate? Certainly Nvidia, Vizio and other TV manufacturers seem to understand.

Jon Peddie's Display Daily gave the technical specifications for the Shield, so I don't need to repeat them here. The unit shown at Pepcom, according to Dodge, was not a standard consumer unit with its 16G of

memory. It was a unit for game developers and included an internal 500G hard drive that will not be in the consumer unit. At least it won't be in the one to be available in mid-May for \$199. I can't imagine that future versions won't have additional storage. According to Peddie, however, streaming content over Wi-Fi from a server in Seattle didn't cause any noticeable glitches so perhaps internal mass storage isn't necessary. Content can be streamed from your home server or over the Internet.

When used as a gaming device, Dodge said the Android-based Shield will be able to run specially developed Shield games. At the launch in May, Nvidia expects 50+ games to be available, some custom for the Shield and some ported from other platforms. The Shield will also run some but not all generic Android games. In particular, since the Shield has no touch screen support since it is intended to be coupled to a TV, it will not run any Android app that requires a touch screen interface. So, no Angry Birds or Candy Crush, in case you were hoping to play them at 4k/60P on a 50" screen. But you can play them on the Nvidia Shield Tablet with its 8", 1920 x 1200 screen, of course. - Matthew Brennessoltz

*Nvidia Shield with its optional remote control (left) and its included game controller*



*For \$898 you can get a Vizio 4k TV and a 4k Nvidia Shield and stream 4k60 content. If CE manufacturers were expecting 4k to provide premium products at premium prices and premium profit margins, they need to think again. (MB)*

## OLED TV: Second Wind?



A combination of company announcements, seemingly reliable reporting and just plain rumors make it reasonable to believe that OLED television is finally getting its second wind.

The reliable reporting centers on LG Display increasing its panel production, with LG Electronics modestly decreasing some set prices. The rumors center on Samsung re-entering the OLED-TV business, but the rumors have some foundation. Let's see if we can sort through some of this.

LG Display (LGD) CEO Han Sang-Beom has said his company plans to ship 600,000 TV-sized OLED panels in 2015, going up to 1.5 million in 2016. LGD estimates the global high-end TV market at 4 million sets, which means that if LGD actually makes and sells those 1.5 million panels next year, OLED-TV will be grabbing more than a third of the high-end market. Although the estimate sounds as if it is being influenced by an excess of enthusiasm, there is a solid foundation for at least a portion of that enthusiasm.

LGD has increased the capacity at its Gen 8 fab to 14,000 substrates per month, which

translates to the 600,000 panels projected for 2015. To support the predicted 1.5 million sets in 2016, input capacity will grow to 34,000 substrates per month by the end of 2015.

An LG representative recently told CNet that LG can't meet the demand for OLED TVs and "cannot build OLED TVs fast enough".

LG seems focused on maintaining its own OLED-TVs as premium products, with the emphasis on 4K. A carryover flat, FHD 55" model is selling for \$1999, while the new curved, 4k 55" will carry an MSRP of \$5499. My personal favorite of the OLED-TV screens LGD showed in its suite at CES was a lovely flat 4k 55" (pictured above). No set price was given, but \$3500 to \$4000 would be a good guess.

The stories concerning Samsung are more speculative. What is not speculative is that Samsung is separating its LCD and OLED business (which it merged in 2012). The move is being seen as possibly being a positive for large-screen OLED at Samsung, since the OLED team will now be able to manage its own affairs without keeping an eye on what is good for the much larger LCD segment. (Samsung's OLED group could not

have been happy to see the Samsung exhibit at CES extolling quantum-dot-enhanced LCD-TV as superior to OLED-TV.)

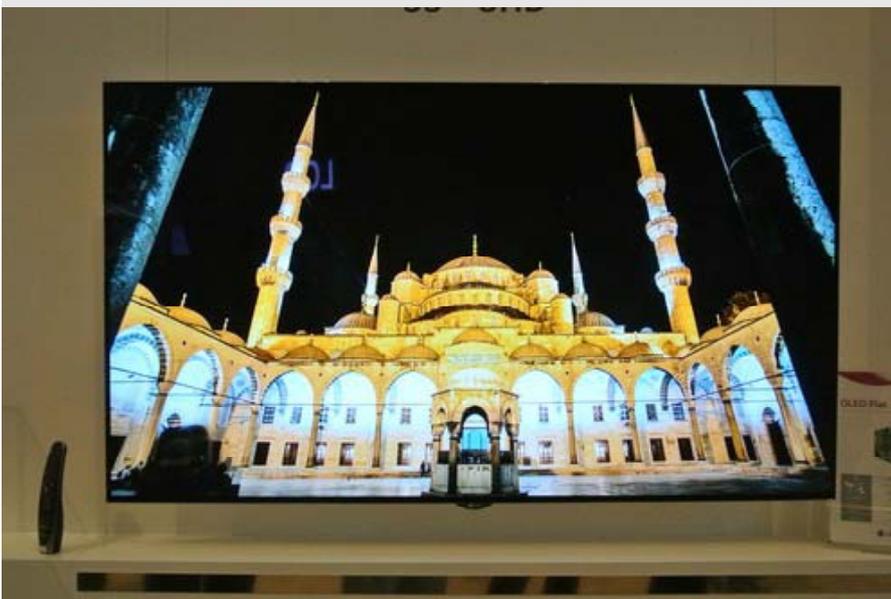
Shortly before this announcement, rumors erupted that Samsung was planning to resume OLED-TV manufacturing. The rumors went on to predict that when Samsung does re-enter the market, it would like to do so using a version of the Kodak-LG color-by-white technology rather than its own RGB technology that has been so successful in small and medium displays.

This is a great rumor but the company is not confirming it, and there is an obvious difficulty: LG's purchase of the Kodak IP and its own subsequent patenting activity make it difficult for Samsung to use this approach.

On the other hand, as revealed at the Nomura Pan-Asia Technology Conference in Hong Kong in May of 2011, Samsung was planning for its first Gen 8 OLED fab to use its RGB OLED technology, but for subsequent Gen 8 fabs to use color-by-white. And there have been other indications that senior Samsung display execs believe that color-by-white with oxide backplanes represent the future of large-screen OLED.

So, that Samsung is thinking of color-by-white for its return to OLED-TV manufacturing should not be a surprise - if they are returning at all.

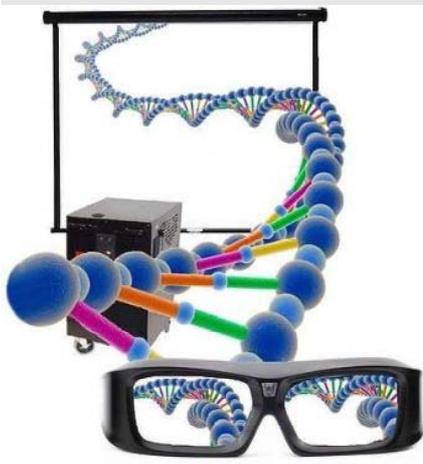
- Ken Werner



# AVRover: Past, Present, and Future



There's a lot of bustle around a certain booth at recent ed-tech conferences, and it is attention that is richly deserved. You see, AVRover has been around a long time, since the very beginning of digital 3D's move into education. Amid constant technological upheaval, that's staying power. Here's their story: past, present, and future.



When the stereo 3D education movement got started, most of the big industry players felt that the best environment for learning in 3D was the 3D 'room': the 3D cave, the 3D lab, the 3D dome, or the dedicated in-school 3D theater. But it was too hard to move the students to the buildings where 3D was located. Transportation costs and headaches presented themselves for district-centralized locations. Similarly, it took too much time in a large high school to shuffle a class of students to a dedicated in-school 3D teaching space. Valuable instructional time was easily lost. Doug Smith, President of AVRover recalled: "We soon determined it would be a lot easier to bring 3D to students rather than students to 3D. That's how our product was born". Thus, AVRover makes a transportable and all-in-one stereo 3D viewing center - in short, a portable classroom 3D solution. And it is easy to use. It

can be rolled into a classroom and ready to use in under two minutes.

At the outset of the 3D in learning movement, technical considerations also complicated the environment. Since 3D content could not be streamed (and still can't for the time being), 3D resources had to be directly connected to the projector or display showing the resource. As a result, producers licensed their software to a specific computer. If you wanted to show 3D in five classrooms, you had to buy five licenses, five displays, five configured computers - you get the picture. These restrictive and medieval licensing policies further diminished the expansion of 3D across the educational world. (Medieval from the perspective of experienced school technologists, that is.) According to Smith, "this drove the industry in the US to lean more toward portable solutions".

So, AVRover has been at it since the very beginning of the digital 3D movement and they are still here, continuously improving and upgrading their solution, based on customer input. The results have been impressive for this small company. Touted as "a classroom's best friend", AVRover is now pushing toward 500 installations in the US, an unarguable success story. Clearly, that's the best penetration of stereo 3D in the US. Currently, 90% of AVRover's business is in the K-12 market and 10% is in higher-ed, military and industrial training programs.

The near future is looking good for this remarkably patient company, as well. "For the first time, we have major districts looking at multiple installations - we've never seen this before", confessed Smith. "We are expecting to sell more this year than in the last four years combined". Now, I describe AVRover as a patient company, because many others in this industry seem to be in a hurry..in a rush to expand, to scale, to make the big deal, to become the next big thing. "We are successful at what we are doing", remarks Smith. "Our specialty is portable classroom solutions, and all this work is finally coming to fruition -

it's starting to go mainstream - with sales of hundreds instead of tens of machines". Clearly, their patience is being rewarded. Doug Smith, President of AVRover

What does Smith see for the future of educational 3D? "Lots more content, many more subject areas", he offers. You can also expect a strong move toward the higher-ed market from AVRover, as they continue to disintermediate the 3D learning experience away from the centralized presentation facility. Attempting to future-proof their product for advent of immersive virtual reality and other advancements, AVRover has built a window in the back of their solution to permit hooking up the Xbox and Xbox Connect and other solutions like the Xbox Kinect technologies. Most interestingly, Smith sees a new pathway for content producers who, unlike the traditional publishers producing only math and science content, will soon be pursuing virtual reality walk-throughs, robust simulations and vocational/industry training content. Although the content has not yet caught up, AVRover is poised and ready.

- Len Scrogan



*Doug Smith, President of AVRover*

# Content Creators Respond as Demand for UHD TV Takes Off



I've often written on the Nanosys blog about the chicken and egg problem that exists between content creators, broadcasters and display makers. When it comes to next generation UHD video features like 4k resolution, wide color gamut and High Dynamic Range (HDR) these three groups have had a hard time agreeing.

In the past, we've seen each side taking a wait-and-see approach with creators and broadcasters waiting to see more capable displays in the market while display makers looked for more content to become available before making compatible screens. That dynamic now appears to be changing rapidly, fueled by growth in China, changes in the way we consume content and the emergence new display technologies.

Even just a year ago, with memories of the slow, painful for early adopters, and ultimately government mandated adoption of HDTV still fresh, there seemed to be little incentive for anyone to break that impasse. Afterall, there would not soon be another nudge from the government, like the switch from analog to digital broadcast, and cable providers are notoriously slow to change (ever notice how your channel guide looks the same as it did in 1998?). So, even as display makers began shipping their first

UHD-capable sets, it looked as though adoption of UHD could be in for an even longer slog to the mainstream than HD.

Then China happened and things started to move fast.

Driven mostly by sales in China, shipments of UHD TVs grew an amazing 633% in last year to over 12 million units. Chinese TV manufacturers looking for an edge were suddenly cranking out sub-\$1,000 UHD sets, making the technology more accessible to more people faster than almost anyone predicted.

Still, the impasse might not have broken without a couple of other technology-driven changes in the market. A new, "over-the-top" direct content distribution model is enabling consumers to access full UHD content today while new hardware in the form of both content creation tools and display technologies are bringing the viewing experience to life.

### Distribution Dynamics

Content distribution is changing rapidly. HBO now offers its service "over-the-top," or without a cable subscription, and companies like Netflix and Amazon are creating dozens of new shows for direct distribution to consumers through their own channels. So, while the broadcast cable middle-man is still there

for most of us, millions of TV viewers now get their content directly from the content creators themselves.

The incentives are totally different for these over-the-top distributors. They're able to efficiently serve even a small population of early adopters by delivering content on a one-to-one basis. This means they can offer premium quality content to customers who want to pay for it without having to make costly or complex changes to a legacy broadcasting backbone. According to Netflix's chief product officer, Niel Hunt:

"If you're a broadcaster or a cable operator, it's very hard to imagine upgrading to HDR or 4k until there are enough televisions at the other end to be able to receive it. You have to allocate channels, you have to allocate new decoders and all the rest of it. Netflix, because we're delivering one-to-one, has the capability to deliver even to a very sparse number of users."

### Capture and Display

UHD means more than just 4k resolution. It's now possible for content creators to capture more colorful, dynamic and lifelike images than ever before with powerful production tools like the ARRI Alexa SXT camera. At the same time new display technologies like quantum dots make it possible to actually see everything that these cameras can capture in our living rooms. We saw a preview of what this looks like at CES this year with nearly every new set from the top brands offering all the immersive UHD features from 4k to wide color gamut to HDR.

The combination of these features offers much more than another incremental improvement in image quality. All of a sudden, or the first time in quite a while, the difference between the TVs consumers have in their living rooms and the new sets at their local Best Buy is dramatic.

### Here Comes the Content

As a result, content creators are beginning to respond with new content that takes advantage of all the new features UHD TV sets

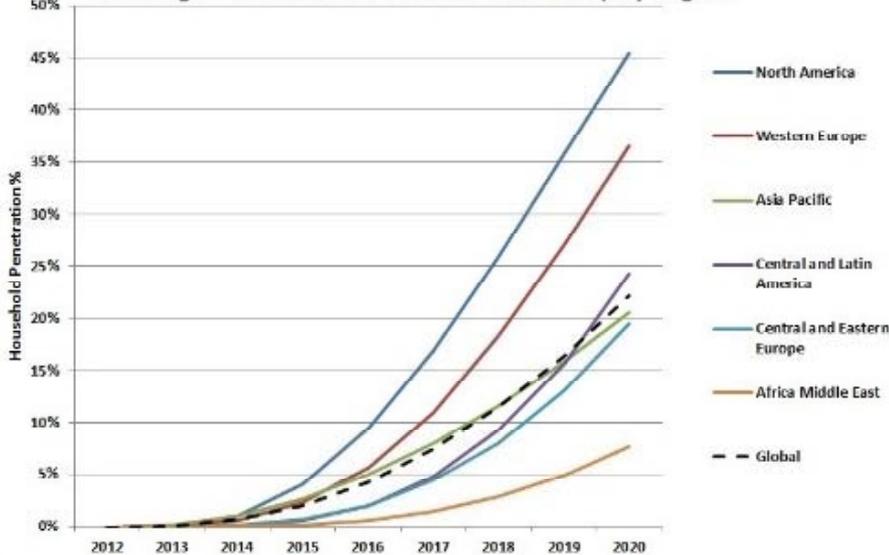
*Netflix says they're shooting 10 new series this year in 4K with HDR and wide color gamut. Marco Polo, the first of these new series, takes full advantage of the new features with its setting in the rich, colorful world of 13th century China.*



# Opinion & Editorial

STRATEGYANALYTICS  
INSIGHTS FOR SUCCESS

Ultra High-Definition TV Household Ownership by Region



*UHD TV Household Ownership.  
Source: Strategy Analytics*

So the impasse is starting to look more like a virtuous cycle with content availability driving interest in upgrades from last-generation flat panels and premium display features showing-off just how great that content can look. Shipments of UHD sets are now expected to double this year and we may see nearly half of US households owning an UHD TV by the year 2020 according to research firm Strategy Analytics. That's just incredibly fast when you look at the adoption of HDTV which saw it's first sets ship in the late 90's and took around 10 years to reach 50% of US households.

- Jeff Yurek

have to offer and they're moving fast too. Just last year Netflix was among the first companies to deliver 4k content to your home with House of Cards. A year later they

say they've already started shooting ten new TV series in full UHD with both wide color gamut and HDR.

## In Brief - Channels

### Channels in Europe

#### Triumph Board Signs The Change in UK

The Change Organisation has signed a deal with Czech-Republic based Triumph Board for exclusive distribution of the company's interactive presentation and AV equipment in the UK and Ireland.

#### Eptimo Adds Peerless-AV

In Poland, Eptimo has added digital signage-oriented solutions from Peerless-AV.

#### Arrow ECS Expands Thin Portfolio

Arrow ECS in the Czech Republic has expanded its range of thin computing products with the addition of Igel devices.

#### Dell Expands Ingram Micro Deal in Europe

Dell has expanded its partnership with Ingram Micro in Europe, so that now Dell's

complete portfolio will be available in Belgium and Luxembourg. Ingram Micro is already a distributor for Dell in Austria, Germany, Switzerland and the UK.

#### Toshiba Chooses Cidexport for Clearance Lines

In France, Toshiba has chosen Cidexport as its official distributor of clearance models. The broker already offers a selection of Toshiba notebooks through local and international resellers.

#### UK Retail Sales in March Up 3.2%

UK retail sales in March increased by 3.2% on a like-for-like basis in March, and on a total sales basis sales improved 4.7%, according to the British Retail Consortium (BRC)-KPMG Retail Sales Monitor. Last month's growth was primarily driven by Easter falling in March this year, earlier than in 2014. Online sales of non-food products grew 12.3% year on year, just slightly lower than the 12.8% growth achieved in March 2014. The survey also

showed that sales of tablets and TVs suffered in March, due to a lack of 'affordable innovation'.

Tablet sales suffered in March across UK retail, but stores enjoyed an overall lift in sales according to new data from the British Retail Consortium and KPMG.

TVs also saw a decline in sales due to a lack of 'affordable innovation', however, small domestic appliances sold strongly throughout the month.

#### Medium Adds Vendors in Germany

Medium has expanded its offering in Germany through three new distribution deals. The company has added touchscreen and interactive displays from Focus Touch, interactive whiteboards from Smit and display supports and mounts from HKS.

#### PSCo and VuWall Sign Partnership

PSCo has been appointed as exclusive UK distributor for VuWall Technology. VuWall

# In Brief - Channels, DOOH

Technology develops collaborative visualisation software for video wall controllers.

## DOOH News

### Electro Sonic is Democratic With Senate Signage Selection

The newly-opened Edward M. Kennedy Institute for the United States Senate (EMK Institute) relies on digital signage to entertain and educate visitors. To faithfully recreate the experience, integrator ElectroSonic used products from multiple vendors. A 'Quote Wall' at the entrance features five 55" displays from NEC and three projectors, using a TVOne edge blending processor. There are 750 Google Nexus tablets around the building and, in six classrooms, ceiling-mounted NEC projectors and AMX touch panels. Nine DHD-555 projectors from Christie are used in the west wing. The centre of the EMK Institute features three video walls (two 1 x 3 and one 4 x 3) using 60" displays from Sharp.



### Exterion Tackles London Transport Network

Transport for London is working with NEC and Exterion Media to modernise advertising in the London Underground. Launching this summer, Exterion's new DX3 platform - using custom-built projectors from NEC Display Solutions - will be used on 15 Zone 1



platforms. Each platform will feature two 11m<sup>2</sup> screens. The NEC projectors have 1920 x 1080 resolution and will output 11,000 lumens of brightness, Exterion told us.

### Ocean Assists in Network Rail Modernisation

Ocean Outdoor has been chosen to provide three new large-format 'Media Eyes' screens to the revamped Birmingham New Street rail station, which will be fully operational this autumn. Each display will measure 30m x 7m and will sit above the main entrances to the station and a flagship John Lewis store nearby. Although still subject to change, pixel pitch is currently set to be 16mm.



### Nike Chooses BigLED for Flagship Store

Nike has installed an indoor LED videowall in its flagship store in Wroclaw, Poland. The 6m<sup>2</sup> screen uses modules from BigLED, with a 3mm pixel pitch.



### Dash In Replaces Static Signage With Adflow

Adflow Networks' signage will be launched in 30 of Dash In Food Stores' locations, in Virginia, Maryland and Delaware, through to 2016. Dash In wanted to eliminate static signage in favour of digital units. Six screens - a combination of 47" and 55" models - will be installed in each store. They will have 1920

x 1080 resolution and 500 - 700 cd/m<sup>2</sup> of brightness, aside from a window display in each location with 2,000 cd/m<sup>2</sup>. The eventual goal is to have signage in about 45 locations, we were told.



### Daktronics Supplies Spain's Largest LED Display

Image credit: InvidisSpanish department store chain El Corte Inglés is modernising. The retailer has installed two large-format LED video boards, in Madrid and Málaga. Both displays use LED modules from Daktronics. The Málaga unit was unveiled in late March with film star Antonio Banderas, who was born in the city. The screen is 13.9m x 9.88m, with a 10.16mm pixel pitch and 6,000 cd/m<sup>2</sup> of brightness. The Madrid screen, which uses the same LEDs, is Spain's largest LED display, at 10.61m x 18.29m (194m<sup>2</sup>).



### Signature Plans For Birmingham Transport Extension

Signature Outdoor has installed a new LED display in Birmingham's financial hub. Cityvision Snow Hill is a portrait-style unit overlooking Queensway, with a fortnightly impact of more 3.5 million people, following an upcoming tram extension. The display is 5.76m x 3.2m, with a 10mm pixel pitch and 300 cd/m<sup>2</sup> of brightness.

*300 cd/m<sup>2</sup> is dim for an outdoor display - we assumed that there had been a typo and it was meant to be*

# In Brief - DOOH, Chips, Supply, Technology

3,000 cd/m<sup>2</sup>, but Signature confirmed to us that the original figure is correct. (TA)



## Semiconductor News

### Graphene Size Raised and Synthesis Time Dramatically Reduced

A Korean company, Haesung DS, has developed a method to mass-produce single-crystal graphene, with a wafer size over 30" and uniform characteristics. As well as producing a large wafer, the company also reduced synthesis time to 17 minutes. Until recently, a sheet of graphene took between three and four hours to synthesise. Synthetic equipment was developed with another company, PNS; the equipment can synthesise four sheets at once using chemical vapour deposition and rapid thermal annealing.

### VixS Adds 'Better Pixels' Support to Decode Line

ViXS has launched the XCode Pro 370 decoder, which integrates new features such as high dynamic range (HDR) and 12-bit colour. The chip has been launched to support the use of UltraHD in production and distribution. ViXS will begin sampling for the device in Q3.

## Supply Chain News

### Sharp Aims at Industrial LCD Takeup

In an interview with the Nikkei, Sharp executive Norikazu Hoshi says that Sharp is aiming to expand sales of LCD panels for industrial applications in China. The company will

establish sales locations in Shenzhen and other locations in July, in an effort to grow sales by 70% over the next three years.

### LGD CEO Details OLED Investment

Han Sang-beom, CEO of LG Display, has spoken to the Wall Street Journal about the firm's plans for OLED investment. LGD will ramp up its second OLED fab by the end of the year, which will produce up to 26,400 substrates per month. A third plant is also being considered. The company is trying to diversify its client base for small screens, away from being reliant on a single customer (Apple).

### Pegatron Capacity Utilisation Falls

Pegatron says that its notebook shipments were up between 30% and 40% MoM in March, to 650,000 - 700,000. Q1 shipments were not so bright, falling 20% QoQ and 20% - 30% YoY, to 2 million - 2.1 million units. Overall capacity utilisation fell in Q1 from Q4'14, and is expected to drop further in Q2.

### Quanta Rises in March, But Q1 is Down

Quanta shipped 4 million notebooks in March, rising 48.1% MoM and 11.1% YoY. The company says that its Q1 shipments were 9.9 million - down 22.7% QoQ and 5.7% YoY. Shipments in April and May are expected to be flat MoM.

### LeTV TV Sales to Double in 2015

China's LeTV is estimated to have sold around 1.6 million LCD TVs in the country last year, and will reach 3.5 million - 4 million this year, say industry sources. Foxconn and TPV are expected to be the main manufacturers. Sources at LeTV said that most sales are coming from 60" sets.

## Technology News

### MEMS Scanning Key to 'Deep' Glasses-Free 3D

A new autostereoscopic (glasses-free) 3D display system is being developed at Beijing's Tsinghua University, aiming to over-

come the drawbacks of existing AS3D displays.

Glasses-free 3D today, using lenticular lenses, optical gratings or micro-lens arrays, suffer from a loss of image depth, low image resolution or shallow viewing angles. The new system uses what developer Hongen Liao calls a 'light homogeneous emitting' (LHE) approach, based on MEMS scanning units. A prototype has created animated 3D images with a perceived depth of more than 6m.



The system generates 3D images by driving multiple LHE MEMS scanning units. Each unit acts as an elemental pixel in the display. Following calibration, light from each MEMS unit is directed to a specific area in space. The result is a spatially-formatted 3D image for a viewer in that position. Different images can be delivered to different locations, thanks to the scanning action of the MEMS units, which enables the system to match the viewer's position relative to the display. Image depth could be extended past 6m by using more MEMS units and enhanced precision calibration of the light rays.

A row of 16 MEMS scanning units were used in the prototype. Resolution was low; the MEMS units were placed in a single row, so "we [could] only display 3D-space images with the same number of pixels as there are units observed from one viewpoint", said Liao. To extend the image, a multi-mirror system was used to effectively transform the 1D arrays into 2D. A 2D array is now being constructed, which will not require the multi-mirror system.

Liao noted that the performance and behaviour of the units is crucial to the system. He said, "We used custom-made MEMS units in our prototype LHE 3D display; but for the system to be put into commercial or industrial use, we do need the MEMS fabri-

# In Brief - Technology, TV

cation to become more compact, allowing real 3D images with high spatial and temporal resolution to become a reality... Digital micromirror device fabrication and related technology could be used to make MEMS units in the future”.

Further integration of light sources, colourisation units and MEMS scanning mirrors should improve the size and scalability of the display. Eventually, Liao envisages building a multi-mode display that includes 2D, binocular, multi-view and integral 3D imaging. Such a unit would be built by adjusting the MEMS scanning modes of the mirror(s) and controlling the input signals accordingly.

Future display development would involve working with DLP and laser projector manufacturers.

The research was published in the journal Nature: <http://tinyurl.com/p5zvf79>.

## Koreans Develop ITO Replacement With 0.1mm Curve Radius

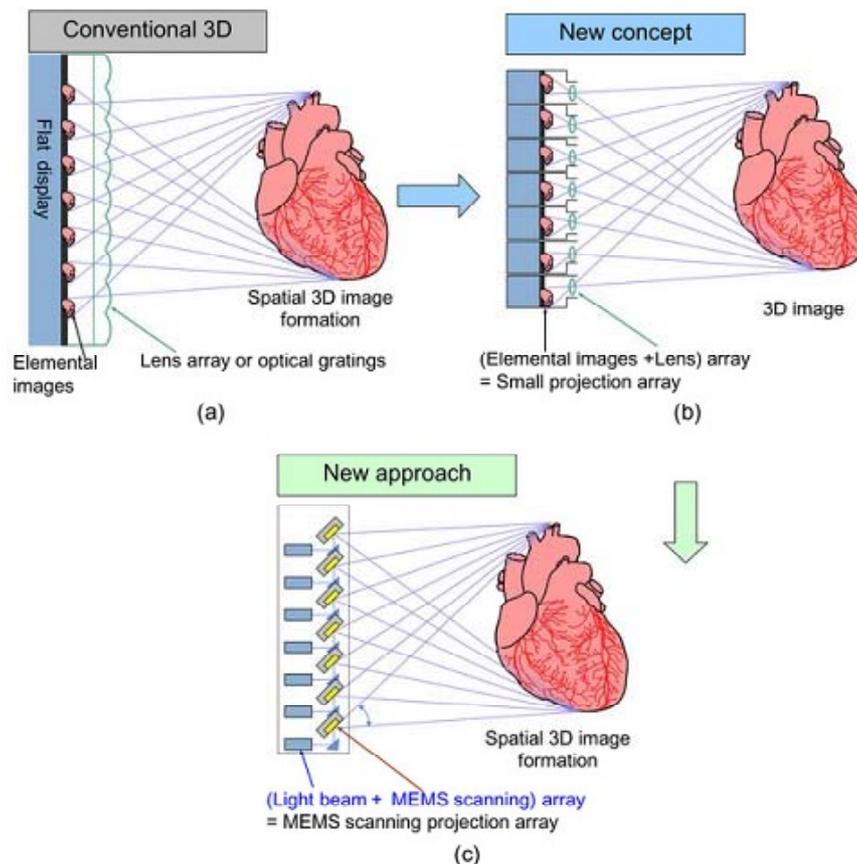
The Korea Electronics Technology Institute (KETI) has developed an ultra-thin OLED elec-

trode material that can be used as an ITO alternative on flexible displays. The material can reach a curve radius of 0.1mm.

According to the researchers, the new material - the electrodes are made by fusing silver nanowires and transparent polyimide - can be bent up to 100,000 times. It reaches 90% light transmittance, with a sheet resistance of 8 Ohms/square.

Existing silver nanowires were not suitable for the new material, as they added a roughness to the polymer substrate. The KETI team added the nanowires to the substrate and adjusted roughness through plasma irradiation, achieving a surface roughness of 0.8nm, similar to existing smartphone glass substrates.

“We are currently discussing mass production with major chemical material manufacturers in Korea, expecting that a fully-foldable smartphone will be available on a commercial scale within two years to come”, the researchers wrote.



## TV In Brief Europe

### OTT Climbs to 100 Million Subs

Research firm Ovum has predicted that premium OTT streaming services will reach 100 million subscribers this year. The shift is especially apparent in mature markets, augmenting free services such as YouTube. With the launch of OTT services by TV providers, such as HBO, Ovum expects the traditional TV value chain to be re-established against technology-led specialists such as Netflix and Amazon. A further 77 million subscribers are expected by 2019.

### HDR Arrives on Amazon

Amazon is to follow in the footsteps of Netflix, rolling out high dynamic range content this year. Prime customers in the USA, UK and Germany will be the first to receive the HDR programming, which will initially be limited to Amazon Originals.

### V-Nova Expands Partnerships

Encompass Digital Media has entered a partnership with V-Nova (V-Nova's Perseus Lowers UltraHD Bandwidth Requirements). There are three solutions the partnership aims to deliver: 1) contribution quality video via the internet at a lower cost than fibre; 2) high quality-streaming media OTT, using less bandwidth than is required today; and 3) UltraHD and 8k TV via satellite to cable systems, using low bandwidth and backwards-compatible with H.264 distribution.

(a) Conventional 3D displays use elemental images and lens array or grating for 3D image generation. (b) 3D imaging can be interpreted as a method for displaying 3D objects at a desired spatial position by emitting light rays through a small projection array comprising an elemental image array and projecting lens array. (c)

With the proposed 3D display approach, MEMS scanning units are formed in the same size as that of the small projection array arranged in (b). Light beams are always scanned two-dimensionally and repeatedly but intermittently transmitted to the viewing area.

# In Brief - TV, UltraHD

## Spanish Pay-TV Market Grows

Spain had more than five million pay-TV subscribers at the end of 2014, up 31.6% from the 3.8 million posted in 2013, according to regulator CNMC. Telefonica was the market leader, with almost 1.9 million subscribers; the company also had the highest growth, rising 65% (741,126). DTS followed (up 2.9%) and Ono (down 0.7%).

## Only 7.5% Say Linear TV Will Remain Important

The Connected100 survey, by the Connected100 research group, has shown that the key TV innovation drivers in coming years will be OTT (87.5% of respondents) UltraHD (77.5%) and TV Everywhere (70%). Linear broadcast (7.5%) will lose out to personalised services accessed through the cloud or connected devices.

## European Commission Examines EU VoD Market

A report on video-on-demand has been published by the European Commission. 'The development of the European market for on-demand audiovisual services' was prepared by the European Audiovisual Observatory. It presents statistics for European VoD in 2014, as well as covering five different sections as they relate to the sector: online advertising; developments in the SVOD market; the prominence of European works in VoD catalogues; the role of VoD service providers in financing content; and the measurement of fragmented audiences. Access the report at <http://tinyurl.com/q828q26>.

## TV in Brief USA

## Top TV Providers Add 5.1 Million Subs in Q4

Informtv's Multiscreen Index, of 100 leading pay-TV providers worldwide, shows that these services grew by more than 5.1 million subscribers in Q4'14 (up 1.42%). The top 10 services added more than 5.3 million throughout the year and had a combined total of almost 130 million customers. Satellite providers grew the most in Q4 (up 2.7 million), followed by telco services (up 2 million). There was a small drop amongst the

top 10 US providers, or 20,600 customers, in Q4, but a gain of 82,200 over the year.

## Netflix Recommends Partners' TVs

Netflix has established its own certification programme to help smart TV buyers. The 'Netflix Recommended TV' logo will be shown at retail stores, on TVs that the company has chosen. Existing TVs with the logo include LG's 2015 UltraHD models; Android TVs from Sony; and Roku TVs from TCL, Hisense and Insignia. Netflix looks for features such as instant on, fast app resume, fast video playback and the latest version of its service pre-installed on the TV.



## Netflix Exceeds 60 Million Subscribers

Netflix added 4.9 million subscribers in Q1'15, according to its recent finance results - taking the total to 60 million subscribers worldwide. Of these, 41.4 million are in the

USA. The new figure represents 24% YoY growth.

## ASO is Coming to Brazil

Analogue switch-off will begin in Brazil this November. 93% of households must have access to digital TV before switch-off can proceed.

## Xbox TV Support Crosses Atlantic

Members of the Xbox Preview programme in the USA and Canada can now start watching live TV through their console. Xbox owners will need to buy an OTA TV tuner from Hauppauge, as well as an HDTV antenna. Microsoft says that it is developing an official tuner with Hauppauge that will debut in the coming months, for \$60. Up until this point, live TV has only been available to European Xbox owners.

## UltraHD News

## BBC Aims at UltraHD in 2016

BBC CTO Matthew Postage has told the Financial Times that the company is likely to start broadcasting UltraHD programmes - and whole channels - in a standardised way next year. The challenge, he said, lies in taking advantage of rapidly-changing technologies and features, such as mobile content viewing, VoD and social media platform access through the TV.

## Netflix Blows Past 60 Million Subscribers

Number of Netflix streaming subscribers (in millions)



\* Forecast given by Netflix  
Source: Netflix

statista

# In Brief - UltraHD, Warranty

## GfK Predicts Significant UltraHD Sales Progress

At the recent MIPTV event in France, GfK shared its UltraHD TV sales data. In the 12 months to January 2015, 298,000 sets were sold in the UK; 294,000 in Germany; and 290,000 in France. Sales in each of the three

major markets this year are likely to fall between 600,000 and 700,000. GfK also showed that the price of an 'average' 50" TV rose by £100 (\$150) in January, to £1,131 (\$1,670).

unit's display is again fused to the cover glass, saving space (and improving contrast - Man. Ed.) but meaning that owners will need to replace two components if one fails. The single USB-C port was criticised, as it is likely to wear down faster than on devices with multiple ports.

## Warranty

### iFixit Gives 2015 Macbook 1/10

Teardown specialist iFixit has found that the secret behind Apple's new Macbook is...glue. Lots and lots of glue. The company gave the device a 1/10 repairability score. Most of the internals are battery, with the connector hidden underneath the notebook's logic board, as it is on the iPad. The



# Product News

## NEC Expands Large-Format Display Range

A 65" version of NEC's X981UHD display has been released. The X651UHD has a 60Hz refresh rate and can display up to four separate content feeds at once. The unit uses an IPS panel with a 1,400:1 contrast ratio, and LED backlight producing 500 cd/m<sup>2</sup>. It can show 10-bit colour, upscale to UltraHD and features DisplayPort and HDMI (x4) ports, as well as an optional OPS slot. NEC will begin selling the display in April, for \$6,900.



## Eizo Prepares for New Colour Space

Two of Eizo's UltraHD monitors - the CG318-4K and CG248-4K (Wide Colour and High Resolution on Eizo's ColorEdgeEizo Reaches New Pixel Density Record) - have had Imagic's 3D look-up table data integrated.

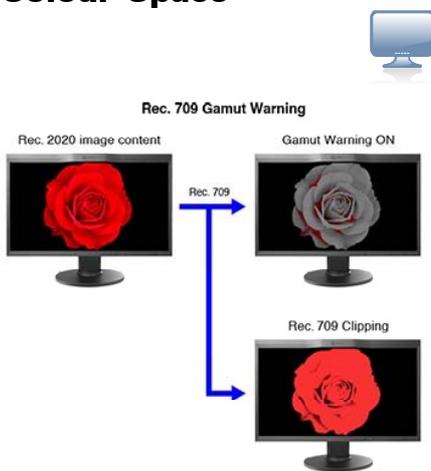
how the content would look to a 'normal' audience using an HDTV.

With the new look-up table, the monitors can be used to display and edit images using the Rec.2020 colour space. Rec.2020 can be used to display colours that are not possible using Rec.709 (aka sRGB).

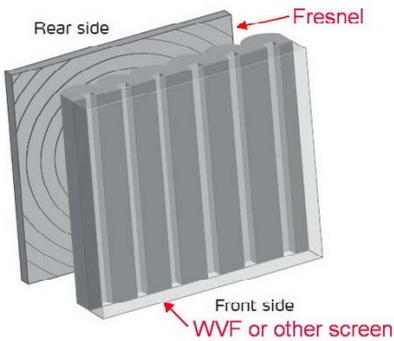
*Rec.2020 has been named as the most likely colour space to be used with UltraHD content in the future, when the industry starts moving to UltraHD Phase 2 (which also includes high dynamic range and frame rates). However, there are few displays today capable of displaying Rec.2020 - LCD displays with quantum dots can come close (91%, or 97% with additional optimisation, according to Jeff Yurek of Nanosys - see Expanded Color Gamuts and Video Encoding), but lasers are necessary to go any higher. Lasers bring their own problems with metamerism. (Are More or Smarter Primaries the Solution to Metameric Failure in Laser Projectors?) (TA)*

A Gamma Warning present is integrated into Eizo's monitors. When selected, areas of a Rec.2020 image that cannot be shown using Rec.709 are converted to shades of grey. An additional mode (Rec.709 Clipping) can be used to view Rec.2020 image with the Rec.709 colour space - this simulates

*Our own Chris Chinnock was at NAB show and shows how this works in a video at <http://tinyurl.com/nslwmk>.*



## DNP Introduces New RP Screen



DNP Denmark (Karlslunde, Denmark) recently launched a new rear projection (RP) screen, called the WVF, short for Wide View FEL Screen, that targets the rear projection cube market, especially for small and mid-sized installations. DNP Denmark is the world-wide large-screen centre of Dai Nippon Printing Co. Ltd (Tokyo, Japan). Søren Weis Lindegaard, Business Manager OEM, told me that the RP cube market is the last remaining significant market for RP screens. He said the market was stable at about 50,000 units per year. While the overall market for video walls is growing, most of this growth is going to narrow bezel LCD displays and fine pitch LED displays. He said the RP cube technology is used mainly in critical control rooms and TV studio back drops.

A rear projection screen actually consists of two elements, as shown in the image. The first is a fresnel lens and it is the rear element, closest to the optical engine. The focal length of the fresnel lens must match the distance between the optical engine and the screen. The purpose of the fresnel is to collimate the light from the optical engine so it arrives at the screen at normal incidence everywhere on the screen. In an ideal world, this would eliminate color and luminance discontinuities seen by off-axis viewers at screen boundaries. Lindegaard said that much of the residual discontinuities are due to chromatic aberrations introduced by the fresnel lens.

The second element is the screen itself. It is chosen by the user to match the needs of the installation, especially brightness, contrast and horizontal and vertical viewing angles. The narrower the viewing angle, the

higher the gain of the screen and the brighter the image seen by an on-axis viewer.

The DNP WVF Screen fills out the gap in the DNP product range between the entry level Ultra Contrast Screen (UCS), and the high-end DNP screens, which include the Cross Prism Screen, the FXS Screen, the CSI Screen and the Black Bead Screen. All of these are standard products at DNP Denmark except the FXS screen. While this has only been sold to few selected customers, Lindegaard believes most of the cube manufacturers know about it.

The WVF screen, like all DNP screens except the Black Bead screen, is made from an acrylic styrene copolymer rather than pure acrylic. This is done because the acrylic styrene copolymer is more dimensionally stable under varying humidity conditions than pure acrylic. This stability allows DNP's OEM customers to design cubes with very narrow gaps between screens, since they don't have to allow for screen expansion.

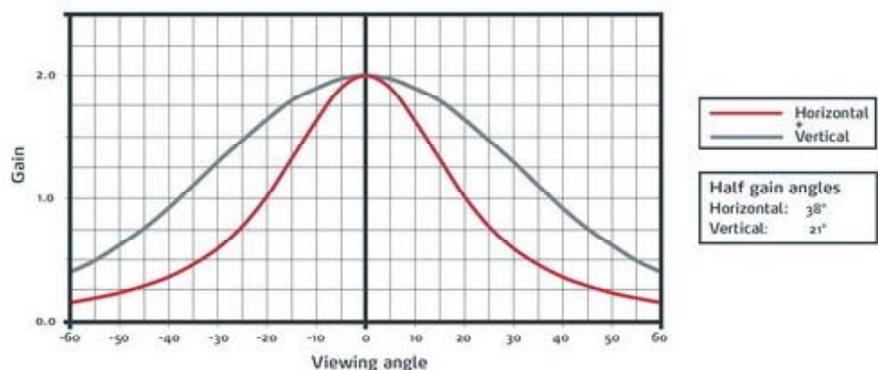
The WVF, like other DNP screens and fresnel lenses, is available in a variety of sizes for 4:3 and 16:9 cubes. The largest size of WVF screen available is the 4:3 1600 x 1200 mm (63 x 47.2 inch) image area screen for an 80" RP cube.

Lindegaard says the DNP WVF is currently available to its OEM customers with 3 – 4 week delivery times. He said the WVF and other rear and front projection screens from DNP will be on display at the upcoming InfoComm in Orlando Florida, June 17 – 19.

–Matthew Brennesholtz

*InfoComm is a key exhibition for RP cube technology and Meko expects all of DNP's OEM customers to be displaying their RP cubes there as well. (MSB)*

Gain vs Viewing Angle for the new DNP WVF screen



## ViewSonic's UltraHD Display is for Colour-Critical use



A 27" UltraHD monitor has been introduced by ViewSonic, after it was previewed at CES this year (ViewSonic Sets New UltraHD IPS Price). Featuring a professional-grade H-IPS panel, the VP2780-4k covers 100% sRGB, 80% Adobe RGB, 99% EBU and 75% of the NTSC colour gamuts. It also displays 10-bit colour, with 14-bit processing, a 3D lookup table and Delta E

Designed for professional and colour-critical users, the monitor features five different gamma settings, ranging from 1.8 to 2.5, as well as the 2.35 gamma setting defined by the EBU, for use in EBU mode. Picture-in-and picture-by-picture modes are supported, and colour is factory-calibrated.

Supporting extended use, the VP2780-4k has a blue light filter and flicker-free LED backlight. It can tilt (-5° - 23°), swivel (120°), pivot (90°) and is height adjustable to 150mm.

As well as UltraHD resolution, the IPS panel provides a 1,000:1 contrast ratio, 178° viewing angles and 5ms response time. Brightness is 350 cd/m<sup>2</sup>. The monitor features DisplayPort, mini-DisplayPort, HDMI, MHL (x2) and USB 3.0 (x4) connections.

ViewSonic is selling the VP2780-4k worldwide now, for \$900.

## Dell's Vostro Notebooks Enhance Productivity



Dell's Vostro notebook line, for mobile and home workers, now has new 14" and 15" models with multiple features designed for productivity. The Vostro 14-3000 and 15-3000 are less than 25mm thick, with a textured cover protecting them from scratches.

Using Intel Core processors, up to Core i5, the notebooks will last for up to 9 hours (14-3000) or 8 hours and 40 minutes (15-3000) on battery. They feature an optical disc drive and built-in HD webcam, for video conferencing. Nvidia discrete graphics are available.

Both models run Windows 8.1 (64-bit) and feature anti-glare displays (1366 x 768, with

1920 x 1080 as an option on the 15"). They have 4GB of RAM, expandable to 8GB, and a 500GB HDD, with 1TB as an option.

Dell is selling the new Vostro models in the USA now, starting at \$350 each.



## Hisense Shares TV Release, Keeps Specs Secret



Hisense announced the 55TX810 last December, but we missed the announcement at the time - our apologies. Release details have now been shared, so we are revisiting the model.

The 55" TV is a curved LCD set, with UltraHD resolution, smart functionality and wireless connectivity in the form of Miracast and DLNA.

Despite being announced five months ago, Hisense has still not shared full specifications. SRS-HD and Dolby Digital audio will be featured, as well as an upscaling proces-

sor. Hisense's motion compensation technology, MEMC, is built in. The TV features HDMI (x3), USB 2.0 (x2) and USB 3.0 ports. The HDMI ports can carry an UltraHD signal at 60fps.

Hisense will begin to sell the TX810 in Europe in May, for €1,850 ex VAT.

## Touch International Combines Day and Night Readability



US-based Touch International has expanded its range of display enhancements. The company can now design, develop and build custom dual-mode sunlight-readable LCD units, which also support night vision use.

The custom displays can be up to 19" and have an operating temperature of -30° - 85°. In night vision mode, these units comply with the MIL-STD-3009 requirements.

TI's LED backlighting technology is designed to maximise efficiency and minimise power draw. Custom LED driver boards provide an extensive dimming capability for the super-bright LEDs, as well as precision constant current control for the night-vision LEDs.

*There are many sunlight-readable high-brightness displays, and almost as many night-vision units. We think this is the first time that we've seen displays combining the technologies, however. (TA)*



## Apple Extends UltraHD Support to Single Stream



Apple has begun to support lower-cost UltraHD displays with the release of OSX 10.10.3.

Previously, Apple's devices would only send UltraHD signals to Multi-Stream Transport displays at 60Hz. With this change Single-Stream Transport models, like Dell's UP2715K, are also supported at 60Hz. SST models tend to be lower-cost than those with MST technology.

Apple has officially announced SST support in various Macbook, Mac and iMac devices, produced from late 2013 onwards. They include the 13" Macbook Pro (2015) and 15" Pro Retina (2014), Mac Pro (2013) and Mac Mini (2014), 27" iMac (2013 onwards), Macbook Air (2015) and 12" Macbook Retina (2015).



# Product News

## Sony's Lifespace Bundled With High-Contrast Screen



More than a year after it was announced at CES 2014 (Display Monitor Vol 21 No 3), Sony's Lifespace UX projector - the LSPX-W1S - has been launched in Europe. It is an ultra-short throw model producing DCI-4k resolution images, up to 147".

Sony's projector will be available bundled with a new short-throw projection screen from Screen Innovations (SI), for commercial installations. The new screen - the 5 Series Zero Edge - is specifically designed for bottom-throw UST projectors like the LSPX-W1S.

Made from a proprietary optic material, the 5 Series screen has a 180° viewing angle

and 700% better contrast than a conventional screen, says SI. This combats the problem of image wash-out in bright environments.

The screen will be available in 92" - 120" sizes and starts at \$4,200.

*Of course, if you have a laser source from a very acute angle, there is much more you can do to reject ambient light reflection and give much better contrast. In a video, there's an impressive demonstration of a white card being held in front of the screen, showing how much better the contrast is on the screen: <https://vimeo.com/124938862>. (BR)*



## NEC Saves Power for Education



NEC's new LCD desktop monitors are part of the Accusync line, which is aimed at classrooms and small-and-medium businesses. Both models - the 20" AS203WMi and 23.6" AS242W - have an eco mode and NEC's Intelligent Power Management (IPM). IPM adds an off-timer and other power-saving features.

Both units feature dual digital/analogue inputs (DVI-D and VGA), and can accept signals from each simultaneously. They also share a 1,000:1 contrast ratio.

The AS203WMi uses an IPS panel, with 178° viewing angles, 1600 x 900 resolution and a 14ms response time. NEC has built a TN panel into the larger model, however; it has 170°/160° viewing angles, 1920 x 1080

resolution and a 5ms response time. Brightness is 250 cd/m<sup>2</sup> for both units.

The new Accusync displays will be available this month, for \$170 (AW203WMi) and \$200 (AS242W).



## Product Roundup



UK and US customers can now pre-order **Apple's** new 12" Macbook (Apple Plugs TV, Adds a New MacBook and erm.... Shows Some Watches), which features a single USB-C port. The waiting time is drastically different, though; while US buyers have a wait of up to three days, those in the UK will have to wait three-to-four weeks. Prices start at £875 (\$1,280), scaling to £1,085 (\$1,585).

**Asus'** Transformer Book T100 Chi (Asus Swims Against Current With Mobile Announcements) is now on sale in the UK. It costs £335 (\$490). The 12.5" T300 Chi will follow in Q2, starting at £560 (\$820).

In addition, China's Apple Daily claims that Asus will launch gaming notebooks with USB-C connectors in the second half of the year.



**Christie's** laser projectors - the CP42LH, D4K60LH and 4KLH (Display Monitor Vol 21 No 27) - are now on sale worldwide.

**Google's** second-generation Chromebook Pixel laptop (Google Boosts Pixel to Ludicrous Speed (Officially)) will go on sale in the UK on 21st April. The basic model (8GB RAM, 32GB storage and Core i5 processor) will cost £665 (\$975). The higher-end unit (16GB RAM, 64GB storage and Core i7 processor) will cost £835 (\$1,225).



**Konka** used the recent CITE show, in China, to introduce two quantum dot LCD TVs, using dots from **QD Vision**. The TVs are designed for the Chinese market and are high-end models.

We have received the price for **Optoma's** EH415ST short-throw DLP projector, shown at ISE. Prices will start at £915 (\$1,345), depending on warranty.

**Panasonic** will renew its Toughpad UltraHD tablet this year with a Core i5 Intel Broadwell processor. The 20" tablet (Display Monitor Vol 20 No 3) will also have a full-size HDMI port added, which can carry UltraHD content at 60fps. It will be launched in July, for \$3,000 - half the price of the first-generation model.

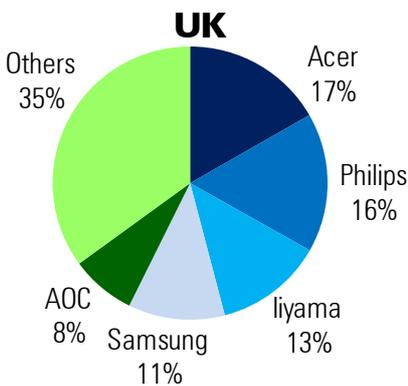
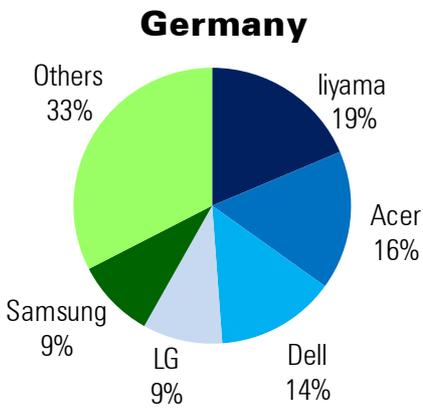
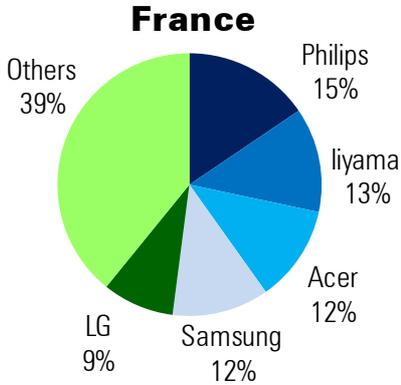


We also hear that Panasonic will release its PT-VW350 projectors in May. These are 3LCD models with Intel's WiDi technology - the world's first. They were first seen at ISE this year. The range consists of the PT-VW355N (1280 x 720, 4,000 lumens) and PT-VX425N (1024 x 768, 4,500 lumens), which are networkable and feature Miracast. Two non-networkable variants, with similar base specifications, will also be launched: the PT-MIV350 and PT-VX420.

All prices are ex VAT, where applicable.

# Dynamic Focus - 19" LCD Monitors

## PageShare by Country

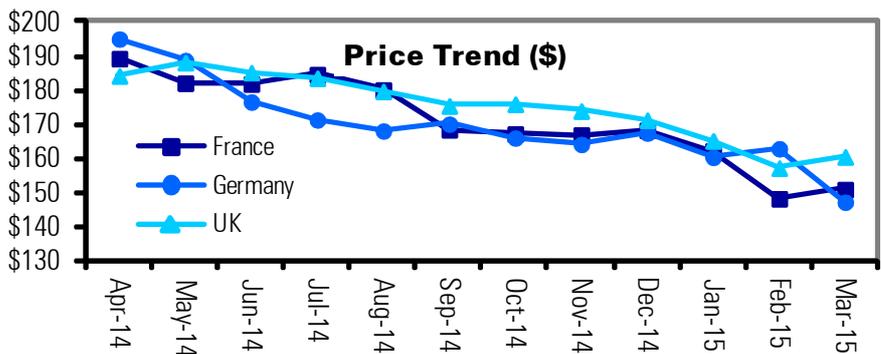
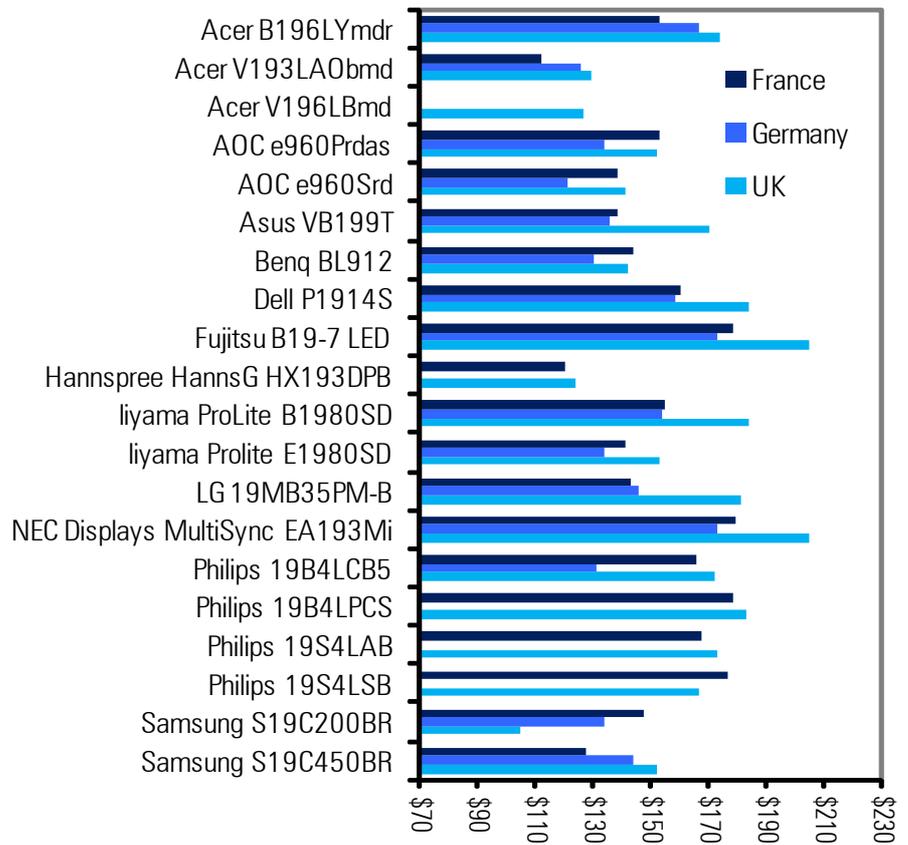


This week we are highlighting LCD monitors in the 19" standard aspect ratio (5:4) category. There are 16 brands featured in the advertising with Acer, Philips and liyama the top three advertised brands. In France, Philips leads with liyama in second and Acer and Samsung in joint third. In Germany, liyama leads with Acer in second and Dell in third, while in the UK, Acer is top followed by Philips in second and liyama in third.

Over the three countries, liyama takes the top two positions with the ProLite B1980SD and the ProLite E1980SD followed by Samsung's S19C450BR in third. In France, LG's 19MB35PM-B is top followed by

Samsung's S19C450BR in second and liyama's ProLite B1980SD in third. In Germany, Dell's P1914S is top followed by liyama's ProLite E1980SD in second LG's 19MB35PM-B in third. In the UK the top three models were liyama's ProLite B1980SD, liyama's ProLite E1980SD and BenQ's BL912.

The average dollar price went down by 16% year on year over the three countries. The average dollar price in France was down 20% YoY, while in Germany it was down 25% and in the UK it was down 13%. The minimum price in March for a 19" standard LCD monitor was \$80.05 plus tax.



For more information on the DisplayCast service, please call Bob Raikes on +44 (0)1252 835385 or email [bobr@meko.co.uk](mailto:bobr@meko.co.uk)

## REAR PANEL

**Samsung** has 'taken over' London department store Harrods, with a display called 'Experience Innovation at Harrods'. Alongside window displays, Samsung branding features inside the store until 24th April, including digital screens and static signage. A separate installation shows technology advancements over the last 25 years. Customers can purchase various Samsung products, including a limited edition platinum-gold version of the Galaxy S6 Edge.



**Barco** has assisted with the outfitting of the world's largest single 6P laser cinema. The Barco Laser Theatre was built by the Eying Group in Chengdu, China and uses Barco's DP4K-60L projector. It is located in the Eying 1958 Cinema film theme park, with a 20m x 11m screen with a gain of 1.4. The projector can produce 3D images on this screen at 14fL of brightness (conventional projectors reach about 4.5fL in 3D).

**Grundig's** Vision 8 UltraHD TVs and TP8 remote control have won Good Design Awards.

**Eizo's** Flexscan T23 81W touch screen monitor has been chosen by the USA's Federal Aviation Administration (FAA), for use in En Route Information Display Systems (ERIDS). ERIDS are used to map flights and manage important information. Eizo's 23" monitor will be rolled out to more than 1,200 workstations this year.



**Jon Peddie**, display analyst and friend of Display Monitor's publisher, Meko, has been granted the CAD Society's Lifetime Achievement Award. Peddie received the award in recognition of his outstanding lifelong pioneering, consulting and analysis service dedicated to advancing the pixel.



An **Apple 1** computer - one of only 13 still in existence - has been listed on eBay. The seller is Bob Luther, who is selling off his collection of Apple products. 10% of the profits will go towards the ALS Association. Luther sold an Apple 1 on eBay last year, for \$365,000. The new sale includes the (working) computer, as well as a cassette interface, original clam shell case, date-stamped keyboard, replica operating manual signed by Steve Wozniak and a 'correct and period' Sony Solid State TV-115 television. At the time of writing, bids had reached \$20,600. Find the listing at <http://tinyurl.com/nsfv2>.

**Samsung** has launched the 'Samsung Spring Hospitality TV Buy Back Programme' in the USA, aiming to help hotels upgrade existing in-room TVs to Samsung's newest units. On orders of 50+ TVs, placed before the end of June, Samsung will co-ordinate collection and removal of old TVs, which will be recycled or reused; and offer direct cash-back options based on their size, age and technology.

**Apple** has announced the date of its Worldwide Developer Conference. For 2015 the event will take place on 8th June, at the Moscone Centre in San Francisco. The tagline this year is 'The epicenter of change', and iOS 9 is widely-expected to be shown off.



Distributor **Mentor** will attend the PCR Boot Camp on 14th May at Whittlebury Hall in the UK. The company specialises in displays, and will show its self-manufactured touch screens, toughened-glass displays and privacy filter monitors. Also on show will be a "multi-coloured touchscreen [sic]". Mentor stocks products from NEC, Toshiba, Iiyama and AG Neovo.

**Barco** has shared details of its CinemaCon 2015 (20th - 23rd April, Las Vegas) stand. Visitors will be able to view a demonstration of an UltraHD laser projector, showing 3D at 60fps, as well as the panoramic three-screen Barco Escape system (Barco Describes Continuing Evolution of Escape Theatrical Format in this issue). Other demonstrations will include the Auro sound system as well as solutions for lobbies and interactivity.

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## About the publisher...



Meko Ltd is the leading specialist European market research consultancy and publisher whose topic is Electronic Displays.

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